

Oregon

DEPARTMENT OF
ENVIRONMENTAL
QUALITY

NORTHWEST REGION

February 17, 1994

RECEIVED

FEB 22 1994

Mr. Thor Sorenson
James River Paper Company, Inc.
Wauna Mill
Clatskanie, OR 97016

Re: Renewal of Air Contaminant
Discharge Permit No. 04-0004

Dear Mr. Sorenson:

The Department of Environmental Quality has completed review of your application. We have issued the enclosed Air Contaminant Discharge Permit. This permit will be considered as the final action on permit application number 13322.

If you are dissatisfied with the conditions or limitations of this permit, you have 20 days to request a hearing before the Environmental Quality Commission or its authorized representative. Any such requests shall be made in writing to the Director and shall clearly state the grounds for the request.

You are urged to carefully read the permit and take all possible steps to ensure compliance with the conditions established. If you have any questions regarding the permit, please contact George Yun at (503) 229-6093.

Sincerely,



Jay Thomas Collins
Permit Coordinator
Air Quality Section
Northwest Region

JC:jc
Enclosures

cc: George Yun, Air Quality Division, DEQ
Brian Fields, Air Quality Division, DEQ
U.S. EPA
file



2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice TDD
DEQ-1

AIR CONTAMINANT DISCHARGE PERMIT
Department of Environmental Quality
811 S.W. Sixth Avenue
Portland, OR 97204-1390
Telephone: (503) 229-5696

Issued in accordance with the provisions of ORS 468A.040 and based on the land use compatibility findings included in the permit record.

ISSUED TO:

James River Paper Company, Inc.
Wauna Mill
Clatskanie, OR 97016

INFORMATION RELIED UPON:

Application No.: 13322
Date Received: 7/19/93

Letter dated 1/28/94

PLANT SITE LOCATION:

Wauna, Oregon

LAND USE COMPATIBILITY STATEMENT:

From: Clatsop County Planning Dept.

Dated: 10/8/93

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Edward Wood

Tom Bispham, Northwest Region Administrator

2/18/94

Dated

Source(s) Permitted to Discharge Air Contaminants:

TYPE OF FACILITY (FROM TABLE 4, OAR 340-28-1750)

STANDARD INDUSTRY CODE

21.(a) Bleached Kraft Pulp and Paper Mill	2621
44.(a) Incinerator, 640 tons/day capacity	4953
60. Fuel Burning Equipment, Outside	4961
AQMA, Greater than 30 million btu/hr	

PERMITTED ACTIVITIES

The permittee is herewith allowed to discharge exhaust gases containing air contaminants only in accordance with the permit application and the limitations contained in this permit. Until such time as this permit expires or is modified or revoked, the permittee is herewith allowed to discharge exhaust gases from those processes and activities directly related or associated thereto in accordance with the requirements, limitations, and conditions of this permit from the air contaminant source(s) listed above.

Compliance with the specific requirements, limitations and conditions contained herein does not relieve the permittee from complying with all other laws, rules and standards administered by the Department, nor does it allow significant levels of emissions of air contaminants not limited in this permit or contained in the permit application.

PERFORMANCE STANDARDS AND EMISSION LIMITS

1. The permittee shall at all times maintain and operate all air contaminant generating processes and all air contaminant control equipment at full efficiency and effectiveness, such that the emissions of air contaminants are kept at the lowest practicable levels.
2. Particulate emissions from any single air contaminant source; except recovery furnace, smelt dissolving tank, lime kiln, fluid bed boiler, and other steam generating boilers; shall not exceed the following:
 - a. 0.20 grain per dry standard cubic foot for sources existing prior to June 1, 1970;
 - b. 0.10 grain per dry standard cubic foot for sources installed, constructed, or modified after June 1, 1970; and
 - c. An opacity equal to or greater than twenty percent (20%) for a period aggregating more than three (3) minutes in any one (1) hour.
3. Particulate matter which is larger than 250 microns and which may be deposited upon the real property of another person shall not be emitted.
4. The permittee shall operate the recovery furnace such that visible emissions shall not exceed thirty five percent (35%) opacity for a period or periods aggregating more than thirty (30) minutes in any one hundred eighty (180) consecutive minutes or more than sixty (60) minutes in any twenty four (24) consecutive hours (excluding periods when the facility is not operating) and shall not exceed the following:

<u>Pollutant</u>	<u>Daily Average</u>			<u>Daily Average</u>	
	<u>gm/dscm</u> (a)	<u>(gr/dscf)</u>	<u>PPM</u> (b)	<u>kg/ADMT</u> (c)	<u>(lbs/TADP)</u>
Part	0.30	(0.13)	—	2.0	(4.0)
TRS	—	—	10(d)	0.15	(0.3)
SO ₂	—	—	300(e) (f)	—	—

<u>Pollutant</u>	<u>Daily Limit</u>	
	<u>kg/day</u>	<u>(lbs/day)</u>
Part	2,036	(4,072)
TRS	80	(176)
SO ₂	—	—

- Notes: (a) Gram per dry standard cubic meter corrected to 8% oxygen, corresponding English unit (grain per dry standard cubic foot).
 (b) Parts per million by volume on a dry basis corrected to 8% oxygen.
 (c) Kilograms per equivalent air-dried metric ton of unbleached pulp; corresponding English unit (pounds per equivalent air dried ton of unbleached pulp).
 (d) Daily arithmetic average.
 (e) 3-hour arithmetic average.
 (f) Emission limits include emissions from any auxiliary fuel used (natural gas or fuel oil).

5. The permittee shall operate the lime kiln such that visible emissions shall not exceed twenty percent (20%) opacity for a period aggregating more than three minutes in any one (1) hour and shall not exceed the following:

<u>Pollutant</u>	<u>Daily Average</u>		<u>PPM(h)</u>	<u>Daily Average</u>	
	<u>gm/dscm(g)</u>	<u>(gr/dscf)</u>		<u>kg/ADMT(c)</u>	<u>(lbs/TADP)</u>
Part	0.46	(0.20)	—	0.50	(1.00)
TRS	—	—	20	0.05	(0.10)

<u>Pollutant</u>	<u>Daily Limit</u>	
	<u>kg/day</u>	<u>(lbs/day)</u>
Part	586	1,172.6
TRS	24.3	48.5

- Notes: (g) Gram per dry standard cubic meter corrected to 10% oxygen, corresponding English unit (grain per dry standard cubic foot).
 (h) Parts per million by volume on a dry basis, as a daily average, corrected to 10% oxygen.

6. The permittee shall operate the smelt dissolving tank such that visible emissions shall not exceed twenty percent (20%) opacity for a period aggregating more than three (3) minutes in any one (1) hour and shall not exceed the following:

<u>Pollutant</u>	<u>Daily Average</u>			
	<u>kg/ADMT(c)</u>	<u>(lbs/TADP)</u>	<u>gm/kg BLS(i)</u>	<u>(lb/ton BLS)</u>
Part	0.25	(0.50)	—	—
TRS	—	—	0.0165	(0.033)

<u>Pollutant</u>	<u>Daily Limit</u>	
	<u>kg/day</u>	<u>(lbs/day)</u>
Part	254.5	(509)
TRS	22	(49)

- Notes: (i) Gram per kilogram of black liquor solids, dry weight, fired; corresponding English unit (pound per ton of black liquor solids, dry weight, fired).

7. The permittee shall operate the plant such that the total TRS emissions from "other sources", excluding lime kilns, recovery furnaces, smelt dissolving tank vents, and including, but not limited to knottter vents, washer hood vents, washer seal tank vents, washer filtrate tank vents, condensate tanks, and black liquor storage tanks shall not exceed 0.078 kg/ADMT (0.156 lb/TADP).
8. The permittee shall operate and control the steam generating boilers, other than Fluid Bed Boiler (FBB), in accordance with the following list of boiler operating parameters and emission limitations:

<u>Boiler Identification</u>	<u>Fuel Used (j)</u>	<u>Maximum Emission Limits</u>		<u>Design Capacity (m)</u>
		<u>Opacity (k)</u>	<u>Particulate (l)</u>	
Babcock & Wilcox	oil/ng	40%	0.46 (0.20)	450,000
Wabash Pwr. Equip.	ng	20%	0.23 (0.10) (n)	125,000
Screw Press Boiler	ng	20%	0.23 (0.10)	5,000

- Notes:
- (j) Oil means residual or distillate fuel oil, ng means natural gas.
 - (k) Maximum opacity that shall not be equalled or exceeded for a period or periods aggregating more than three (3) minutes in any one hour, excluding uncombined water vapor.
 - (l) Particulate emission limitation is stated in grams per dry standard cubic meter, corrected to 12% carbon dioxide (CO₂); (corresponding English unit, grains per dry standard cubic foot).
 - (m) Maximum hourly average steam production (pounds per hour).
 - (n) The Package (Wabash) boiler shall also be operated with a minimum 4% excess oxygen to minimize the CO emission.

9. The permittee shall operate the FBB such that visible emissions shall not exceed ten percent (10%) opacity for a period or periods aggregating more than six (6) minutes in any sixty (60) consecutive minutes, and shall not exceed the following:

<u>Pollutant</u>	<u>Maximum Emission Limit</u>		<u>Daily Limit</u>
	<u>gr/dscf(o)</u>	<u>PPM(p)</u>	<u>(lbs/day)</u>
Part	0.01	—	90
SO ₂	—	50(q)	520
Hcl	—	50(r)	296
CO	—	50(s)	227
NO _x	—	175(t)	1,306

- NOTES:
- (o) Grains per dry standard cubic foot corrected to 7% oxygen at standard conditions.
 - (p) Parts per million corrected to 7% oxygen at standard conditions.
 - (q) Or shall be reduced by at least eighty (80) percent by weight on a three-hour basis.
 - (r) Or shall be reduced by at least ninety (90) percent by weight on an hourly basis.

- (s) Based on an 8-hour average. If CO levels exceed 150 ppm corrected to 7% oxygen over a continuous 15-minute period, reduce (or cease) charging of solid fuels and switch to more natural gas fuel.
- (t) Based on a 24-hour average.

10. In addition to Condition 9, the permittee shall operate and control the FBB in accordance with the following list of boiler operating parameters and emission limitations:

- a. Combustion gases shall be maintained at a minimum temperature of 1800°F with a residence time of at least one second.
- b. Fluid bed boiler shall be operated with automatically controlled auxiliary burners.
- c. Except during periods of startup and shutdown, the FBB shall achieve a combustion efficiency (CE) of 99.9 percent based on a running eight-hour average, computed as follows:

$$CE/100 = CO_2 / (CO_2 + CO)$$

CO = Carbon monoxide in the exhaust gas, ppm by volume (dry)

CO₂ = Carbon dioxide in the exhaust gas, ppm by volume (dry)

- d. The flue gas temperature at the outlet from the primary control device (baghouse) shall not exceed 350°F.

11. Non-condensable gases shall be continuously collected and treated as follows:

- a. TRS from digesters, multiple-effect evaporators and other miscellaneous collection points shall be continuously treated by efficient incineration.
- b. In the event that the equipment (lime kiln) in use at any time for incinerating non-condensibles fails or is removed from service, the efficient incineration of non-condensibles shall be transferred to an alternate device within one hour. The venting of non-condensibles shall be minimized, to the lowest extent possible, but in no case shall the time exceed one hour.

12. Particulate emissions from non-fuel burning sources noted below shall not exceed the following:

- a. 0.46 gm/dscm (0.20 gr/dscf) for the paper machine winder rotoclones, Kraft mill roof cyclone, lime slaker stack, chip handling screen room cyclones, and pulp dryer.
- b. 0.23 gm/dscm (0.10 gr/dscf) for the saltcake handling baghouse, clay handling baghouse, converting plant baghouse, and the FBB material handling cyclones/baghouses.

- c. An opacity equal to or greater than twenty-percent (20%) for a period aggregating more than three (3) minutes in any one hour, from any source listed in a and b.
13. The permittee shall not use any residual fuel oil containing more than 1.75 percent sulfur by weight.
14. The permittee shall not use any distillate fuel oil containing more than:
- 0.3 percent sulfur by weight for ASTM Grade 1.
 - 0.5 percent sulfur by weight for ASTM Grade 2.
15. The permittee shall not allow the emission of odorous matter or other fugitive emissions so as to create nuisance conditions off the permittee's property. Nuisance conditions will be verified by the Department personnel. The creation of nuisance conditions may, in addition to any other action the Department may take, result in a permit modification to require a compliance schedule to control the nuisance conditions.
16. The permittee shall minimize fugitive dust emissions by:
- Treating vehicular traffic areas of the plant site under the control of the permittee.
 - Storing collected material from air pollution control equipment in a covered container or other method equally effective in preventing the material from becoming airborne during storage and transfer.

Plant Site Emission Limits

17. Plant Site Emission Limits (PSEL) shall not exceed the following:

<u>SOURCE</u>	<u>ANNUAL PSEL</u> (tons/year)					
	<u>TSP</u>	<u>TRS</u>	<u>SO₂</u>	<u>CO</u>	<u>NO_x</u>	<u>VOC</u>
Recovery Boiler	313	19.6	410	1,760	325	132
Smelt Dissolving Tank	80	7.5	32	—	—	—
Lime Kiln	117	4.5	32	16	160	40
Power Boiler	52	—	643	4	794	2.5
Fluid Bed Boiler	16	—	95	41	238	24
Other Sources	<u>837</u>	<u>15</u>	<u>19</u>	<u>53</u>	<u>96</u>	<u>273</u>
ANNUAL PSEL	1,415	46.6	1,231	1,874	1,613	471
UNASSIGNED PSEL	222	—	648	—	—	273
TOTAL PSEL	1,637	46.1	1,879	1,864	1,613	744

DAILY PSEL
(lbs/day)

<u>SOURCE</u>	<u>TSP</u>	<u>TRS</u>	<u>SO₂</u>	<u>CO</u>	<u>NO_x</u>	<u>VOC</u>
Recovery Boilers	4,072	175.6	9,914	11,198	2,252	841
Smelt Dissolving Tank	509	48.7	204	—	—	—
Lime Kilns	1,173	48.5	235	117	1,173	293
Power Boilers	1,633	—	21,888	97	11,312	80
Fluid Bed Boiler	89	—	520	227	1,306	130
Other Sources	<u>7,073</u>	<u>182.9</u>	<u>5,660</u>	<u>3,885</u>	<u>2,536</u>	<u>1,860</u>
DAILY PSEL	14,549	456	38,421	15,524	18,579	3,204

NOTE: The permittee shall notify the Department in writing, and obtain approval prior to using "Unassigned PSEL".

Operating parameters, emission factors, and emissions are shown on the attached Plant Site Emissions Detail Sheets.

Source Emission Reduction Plan

18. In the event an Air Pollution Alert, Warning, or Emergency Episode is declared in the Westport or Clatskanie area by the Department, the permittee shall take the action appropriate to the episode condition as required by OAR 340-27-015. The permittee shall take such action when the permittee first becomes aware of such a declaration whether through news media, direct contact with the Department, or from other sources.

The permittee shall take the actions listed below when an air pollution episode is declared:

- a. ALERT: Prepare to curtail combustion of oil or solid fuels
- b. WARNING: Reduce solid fuel/oil consumption
- c. EMERGENCY: Cease burning solid fuel or oil

During an applicable Air Pollution Episode, this Source Emission Reduction Plan shall be available on the source premises for inspection by Department personnel.

Source Testing Requirements

19. By no later than 60 days after the commissioning of the co-generation facility and FBB, the permittee shall demonstrate the ability to operate in continuous compliance with the permit Conditions 9 and 10 by performing source test on the fluid bed boiler/control system. All tests shall be conducted in accordance with the testing procedures on file at the Department and with the pretest plan submitted at least 30 days in advance and approved by the Department (Source

Test Coordinator). All test data and results shall be submitted for review to the Department within 30 days after the test report is complete, but no later than 100 days after testing. At minimum, the following conditions should be met:

- a. The fluid bed boiler must be operated, at minimum, 50% of its design capacity.
- b. The fuel mixture(s) burned during the source test shall represent and encompass FBB's actual fuel mixtures. Unless otherwise approved by the Department, the fuel mixture(s) shall consist of, at minimum, the following weight percent(%):

i.	wood	20%
ii.	sludge	10% (at minimum 20% WAS)
iii.	natural gas	0%
iv.	TDF	5%
v.	RPF	5%

NOTE: WAS = Waste activated sludge; the rest is primary sludge.
TDF = Tire-derived fuel
RPF = Residual paper fuel

- c. Only regular operating staff may adjust the production process during the source performance tests and within two (2) hours prior to the tests. Any operating adjustments made during the source performance tests, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source performance test invalid.
- d. In addition to the limits specified in Conditions 9 and 10, the permittee shall demonstrate the FBB is capable of operating such that the emissions of toxic pollutants are all within the acceptable range(s). Use the Department's SER Table (December 1991 Draft) and the NESHAP limits as the reference materials. Also refer to the source test plan submitted for pilot plant testing for complete chemical listings and other applicable requirements.
- e. During the source test at minimum the following parameters shall be monitored and recorded:
 - i. opacity readings on the exhaust stack following the procedures of EPA Method 9, or Department equivalent method.
 - ii. weight of material charged
 - iii. type of fuel or physical characteristics of the fuel
 - iv. type of waste or physical characteristics of the waste
 - v. process operating parameters during the emissions source test
 - vi. operating parameters of emission control equipment

Compliance Demonstration Schedule

20. Should the source tests conducted on FBB fail to demonstrate compliance as specified, the permittee shall provide additional control measures according to the following schedule:
- a. By no later than 90 days after the source test, the permittee shall submit a final control strategy, including detailed plans and specifications, to the Department of Environmental Quality for review and approval.
 - b. By no later than 30 days after the Department approves the final control strategy, the permittee shall issue purchase orders for the major components of emission control equipment and/or for process modification work. The Department approval does not guarantee the success of a proposed control strategy - which is solely the permittee's responsibility. The permittee shall notify the Department in writing within seven (7) days that the above has been accomplished.
 - c. By no later than 60 days after the Department approval, the permittee shall initiate the installation of emission control equipment and/or on-site construction or process modification work. The permittee shall notify the Department in writing within seven (7) days that the above has been accomplished.
 - d. By no later than 180 days after the Department approval, the permittee shall complete the installation of emission control equipment and/or on-site construction or process modification work. The permittee shall notify the Department in writing within seven (7) days that the above has been accomplished.
 - e. By no later than 210 days after the Department approval, the source must demonstrate it is capable of operating in continuous compliance with the specified limits in Conditions 9, 10, and 19.

Monitoring and Reporting

21. The permittee shall effectively monitor the operation and maintenance of the Kraft pulp and paper mill and associated air contaminant control facilities. A record of all such data, as required below, shall be maintained for a period of two (2) years and be available for inspection by the authorized representatives of the Department.

All tests shall be conducted in accordance with the testing, monitoring and reporting procedures on file at the Department and with the pretest plan submitted and approved at least 15 days in advance. The test methods and procedures shall be described in the "Quality Assurance Plan" required by condition 22 of this permit.

Unless otherwise agreed to in writing the information collected and submitted shall include but not necessarily be limited to the following parameters and monitoring frequencies. Information to be collected

annually shall be submitted with the monitoring report for December. The following data shall be submitted to the Department by the 15th day of each month after which the data was collected.

<u>Parameter</u>	<u>Information Required</u>	<u>Minimum Monitoring Frequency</u>
<u>a. Recovery Furnace</u>		
1) Particulate	gm/dscm (gr/dscf) for the previous and the latest source test, if a source test was performed during the month; date and time of the source test; volumetric oxygen concentration (%), kg/ADMT (lbs/TADP); daily emissions in kg/day (lbs/day); average daily production ADMT/day (TADP/day).	Recovery furnace - Source tested quarterly except when the previous six (6) source tests were below 0.225 gm/dscm (0.097 gr/dscf) for the recovery furnace, then source tested semi-annually. Correlation with transmissometer shall be checked or a new correlation established, if required.
2) Opacity	All exceedances of 6-minute average opacities 35% or over.	Continuously monitored
3) TRS	24-hour daily averages (PPM) with oxygen corrections, daily emissions in kg/day (lbs/day); kg/ADMT (lbs/TADP); daily cumulative number of minutes over 10 ppm.	Continuously monitored
4) Oxygen (O ₂)	Average volumetric O ₂ concentrations at all RF TRS & particulate measurement points.	As required to determine that 24-hr average O ₂ concentrations are below 8% O ₂ ; or continuously to determine 24-hr average O ₂ concentrations
NOTE: The 24-hour average volumetric oxygen concentrations determined shall be for the same 24-hour periods as the monitored recovery furnace data.		
5) SO ₂	3-hour average ppm concentrations.	Source tested or monitored monthly at a minimum

b. Lime Kiln

- | | | |
|-----------------------------|---|---|
| 1) Particulate | Gm/dscm (gr/dscf) corrected to 10% O ₂ ; if a source test was performed during the month, date and time of the source test; kg/ADMT (lbs/TADP) expressed as daily averages based on prior source test and production data. | Source tested semi-annually, each lime kiln stack |
| 2) TRS | 24-hour daily averages (ppm) corrected to 10% oxygen; daily average kg/ADMT (lbs/TADP); kg/day (lbs/day); daily cumulative minutes over 8 ppm | Continuously monitored |
| 3) Oxygen (O ₂) | 24-hour average volumetric O ₂ concentrations at all LK TRS & particulate measurement points. | Continuously monitored |

NOTE: The 24-hour average volumetric oxygen concentrations determined shall be for the same 24-hour periods as the monitored lime kiln pollutant data.

c. Smelt Dissolving Tank Vent

- | | | |
|----------------|--|--|
| 1) Particulate | gm/dscm (gr/dscf) for the previous and the latest source test, if a source test was performed during the month; date & time of source test; kg/ADMT (lb/TADP) as daily averages, based on previous source test and production data | Source tested quarterly except when the previous six (6) source tests were less than 0.187 kg/ADMT (0.375 lb/TADP), then source tested semi-annually |
| 2) TRS | gm/kg BLS (lb/ton BLS) expressed as 24-hour averages based upon BLS (black liquor solids fired, dry weight), and source test data; daily emissions in kg/day (lbs/day) | Source tested quarterly except when the previous six (6) source tests were less than 0.0124 gm/kg BLS (0.025 lb/ton BLS), then source tested semi-annually |

d. Fluid Bed Boiler

1) Particulate	gr/dscf for the previous and the latest source test, date of the source test, volumetric oxygen concentration (%), flow rate in dscfm, and daily average in lbs/day	Source tested annually
2) Hcl	1-hour average (ppm) corrected to 7% O ₂	Source tested annually
3) Opacity	All 6-minute exceedances of opacities greater than 10% in sixty consecutive minutes	Continuous
4) Oxygen (O ₂)	Average hourly in ppm	Continuous
5) SO ₂	Running 3-hour average in ppm, corrected to 7% O ₂	Continuous
6) CO	Running 8-hour average in ppm, corrected to 7% O ₂ . Compute the CE based on 8-hour average, as specified in Condition 10.c.	Continuous
7) NO _x	Running 24-hour average in ppm, corrected to 7% O ₂	Continuous
8) Baghouse Stack	All exceedances of temperatures > 350°F	Continuous
9) FBB	Combustion chamber temperature profile (°F)	Continuous
	Stack Flow rate (acfm)	Continuous
	Indicate any exceedances of Condition 10.a.	

e. "Other Sources" of TRS Average ppm and kg/ADMT (lbs/TADP) Annual inventory source test

f. Production of both bleached & unbleached pulp & Refiner mechanical pulp (RMP) ADMT/day (TADP/day) Summarized from daily production records

g. <u>Fuel Usage</u>	Amount of natural gas (therms), residual fuel oil (gal) with annual average and maximum sulfur content, distillate fuel oil (gal and grade), and other solid fuels. Usage shall be broken down for recovery furnace, lime kiln, FBB, Power boiler, package boiler, and paper machines & other misc. eqs.	Annual summary
h. <u>Chips and Saw-dust</u>	Amount of chips & saw-dust received (BDT)	Annual summary
i. <u>Dry Chemicals</u>	Amount of limestone & other dry chemicals received for use by FBB	Annual summary
j. <u>Excess Emissions both scheduled & upsets.</u>	Time, duration and source for each occurrence with total monthly hours for each source. In addition any emissions in excess of conditions 2 through 12 shall be reported in conformance with condition G-5 & G-6. Scheduled maintenance that may result in emissions in excess of the conditions noted above require prior notification.	Continuously monitored
k. <u>Non-condensable gas treatment (incineration)</u>	Cumulative minutes of interruption	Continuous

22. A revised "Quality Assurance Plan", which includes new monitoring conditions, shall be submitted to the Department for review within 180 days after issuance of this permit. The plan shall include all elements required to ensure the integrity of all required emissions data. Upon approval by the Department, the plan shall be implemented within thirty (30) days. At least annually, the Department shall be notified of any changes to the Quality Assurance Plan.

Fee Schedule

23. The Annual Compliance Determination Fee for this permit is due on December 1 of each year this permit is in effect. An invoice indicating the amount as determined by the Department, will be mailed prior to the above date.

GENERAL CONDITIONS AND DISCLAIMERS

- G1. The permittee shall allow Department of Environmental Quality representatives access to the plant site and pertinent records at all reasonable times for the purposes of making inspections, surveys, collecting samples, obtaining data, reviewing and copying air contaminant emission discharge records and otherwise conducting all necessary functions related to this permit in accordance with ORS 468.095.
- G2. The permittee shall have available at the facility at all times a copy of the Air Contaminant Discharge Permit.
- G3. The permittee is prohibited from conducting open burning except as may be allowed by OAR 340-23-025 through 340-23-115.
- G4. The permittee shall at all times conduct dust suppression measures to meet the requirements set forth in "Fugitive Emissions" and "Nuisance Conditions" in OAR 340-21-050 through 340-21-060.
- G5. In accordance with OAR 340-28-1400 through 340-28-1450, the permittee shall immediately (i.e. as soon as possible but in no case more than one hour after the beginning of the excess emission period) notify the Department by telephone or in person of any excess emission, other than pre-approved startup, shutdown, or scheduled maintenance. Notification shall include the source name, nature of the emissions problem, name of the person making the report, name and telephone number of contact person for further information, date and time of the onset of the upset condition, whether or not the incident was planned, the cause of the excess emission (startup, shutdown, maintenance, breakdown, or other), equipment involved in the upset, estimated type and quantity of excess emissions, estimated time of return to normal operations, efforts made to minimize emissions, and a description of remedial actions to be taken. Follow-up reporting shall be made in accordance with Department direction and OAR 340-28-1430(2) and 340-28-1440.

Notification shall be made to the appropriate regional or branch office.
Current Departmental telephone numbers are:

Portland	229-5554	Medford	776-6010
Salem	378-8240	Coos Bay	269-2721
Bend	388-6146	Roseburg	440-3338
Pendleton	276-4063		

In the event of any excess emissions which are of a nature that could endanger public health and occur during nonbusiness hours, weekends, or holidays, the permittee shall immediately notify the Department by calling the Oregon Accident Response System (OARS). The current number is 1-800-452-0311.

- G6. The permittee shall notify the Department in writing using a Departmental "Notice of Construction" form, or "Permit Application Form", and obtain approval in accordance with OAR 340-28-800 through 340-28-820 before:

- a. Constructing or installing any new source of air contaminant emissions, including air pollution control equipment, or
- b. Modifying or altering an existing source that may significantly affect the emission of air contaminants, or
- c. Making any physical change which increases emissions, or
- d. Changing the method of operation, the process, or the fuel use, or increasing the normal hours of operation to levels above those contained in the permit application and reflected in this permit and which result in increased emissions.

G7. Application for a modification of this permit must be submitted not less than 60 days prior to the source modification. A Filing Fee and an Application Processing Fee must be submitted with an application for the permit modification.

G8. The permittee shall notify the Department in writing using a Departmental "Permit Application Form" within 60 days after the following:

- a. legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
- b. sale or exchange of the activity or facility.

Applicable Permit Fees must be submitted with an application for the name change.

G9. Application for renewal of this permit must be submitted not less than 60 days prior to the permit expiration date. A Filing Fee, an Application Processing Fee and an Annual Compliance Determination Fee must be submitted with the application for the permit renewal.

G10. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

G11. This permit is subject to revocation for cause as provided in OAR 340-14-045.

ALL INQUIRIES SHOULD BE DIRECTED TO:

Department of Environmental Quality
Northwest Region
2020 SW 4th, Suite 400
Portland, OR 97201
Telephone: (503) 229-5554

Department of Environmental Quality
 Air Quality Division

AIR CONTAMINANT DISCHARGE PERMIT APPLICATION REVIEW REPORT

James River Paper Company, Inc.
 Wauna Mill
 Clatskanie, OR 97016

PSEL CRED	SOURCE TEST	CMS	AMB MON	COMPL SCHED	SPEC COND	REPORT A Q M	EXCESS R N	NSPS	NSR	PSD	NESHAPS	SIZE A1 A2	PUBL NOTC
	X	X		X		X X	X	X				X	X

This permit review is conducted in three parts. First (I), the proposed co-generation project is evaluated separately to distinguish the new emission sources from the existing units. The key emission points are identified and the most restrictive regulatory standards are determined. Secondly (II), non-project related changes are evaluated and the existing limits are updated pursuant to OAR 340-14-040. Lastly (III), the new regulatory requirements, in addition to non-project related modifications and other applicable standards are incorporated into the permit.

I. THE COGENERATION/FLUID BED BOILER (FBB) PROJECT

GENERAL BACKGROUND INFORMATION

1. Eugene Water & Electric Board (EWEB) and Clatskanie People's Utility District (CPUD) funded James River Paper Company, Inc. (JR) to construct and operate a cogeneration facility capable of generating about 25 to 28 megawatts (MW) to be used exclusively in the JR Wauna mill. The projected power production is slightly more than one fourth (1/4) the Wauna mill's total power need. James River's proposed project includes a Fluid Bed Boiler (FBB) to burn wood wastes, tire-derived fuel (TDF), residual paper fuels (RPF), and the primary/secondary sludge generated by the on-site wastewater treatment facility. Natural gas would also be used, primarily to bring the boiler temperature up during startup, and occasionally to control the boiler operating temperature.

No pulp/paper production increase is forecasted at this time, but note that an increased energy capacity naturally increases the potential production capability. It is also worth noting that the new FBB will provide JR the alternative means (previously not available) of managing solid waste, as their land fill space is rapidly diminishing.

The construction is scheduled to begin in October 1994, and expected to last until December 1995. James River predicts an initial startup of the cogen facility to occur in January 1996, and the process optimization may extend to October 1996. This permit is for the total capacity.

2. The FBB/cogen facility includes several other pieces of auxiliary equipment, which would also become air contaminant emission sources. In summary, there would be seven (7) new emission sources associated with the proposed cogen/FBB project:

<u>Emission Sources</u>	<u>Proposed Control</u>
1. Fluid Bed Boiler (FBB)	Baghouse, SNCR, etc.
2. Screw Press Boiler (SPB)	(burns natural gas only)
3. Limestone Silo Bin	Baghouse
4. Limestone Day Bin	Baghouse
5. FBB Sand Silo Bin	Baghouse
6. Ash Storage Silo	Baghouse
7. Ash Storage Silo Bin	Baghouse

The FBB is the major new emission source and will be the main focus of this review. The SPB is a small natural gas fired boiler, and the other emission sources are basically material handling equipments supporting the FBB operations.

Also the existing Power Boiler and Package Boiler will be retrofitted into the new (steam extraction) turbine system. The modification work would mainly consist of redistribution of (steam) pipings, and this would not cause any increase in the plant site emissions.

3. A Land Use Compatibility Statement signed by the Clatsop County Planning department on October 8, 1993, granted unconditional approval of the cogeneration project.

APPLICABLE REGULATIONS / EMISSION LIMITS

4. All applicable Rule limitations/standards reviewed are summarized below. Where more than one rule applies, the most stringent rule is selected as the permit standard (high lighted). Predominantly the Best Available Control Technology (BACT) standards were determined to be most restrictive and thus became the FBB standards. The BACT review is discussed in detail in item 5 of this review report.

<u>Applicable Rules, OAR/CFR</u>	<u>Standards/ Emission Limits</u>	<u>Affected * Source(s)</u>
340-21-015	20% opacity, 3 min/1 hr	All, but 1 & 2
340-21-030	PM = 0.1 gr/dscf	All, but 1 & 2
340-21-020	20% opacity, 3 min/1 hr PM = 0.1 gr/dscf	2
340-22-050/055	SO ₂ = 1.6 lb/MM btu, 2 hr ave.	1

340-25-470/480 (NESHAP)	Beryllium = 10 g/day Mercury = 3,200 g/day	1
340-25-553 CFR 60.40b/49b (NSPS)	PM = 0.10 lb/MM btu NO _x = 0.30 lb/MM btu 20% opacity, 6 min ave. 27% opacity, 6 min/1 hr	1
340-25-555 CFR 60.50/54 (NSPS)	PM = 0.08 lb/MM btu, 12% CO ₂	1
340-25-850/885 (Incinerator)	BACT required for PM, SO ₂ , CO, NO _x , HCl 10% opacity, 6 min/1 hr PM = 0.015 gr/dscf @ 7% O ₂ SO ₂ = 50 ppm @ 7% O ₂ ; or 70% reduction CO = 100 ppm @ 7% O ₂ , 8 hr ave. = 150 ppm max @ 7% O ₂ , 15 min ave. NO _x = 200 ppm @ 7% O ₂ , 24 hr ave. Hcl = 50 ppm @ 7% O ₂ ; or 90 wt% reduction, 1 hr ave. T _{incineration} = 1,800°F for 1 second T _{out} = 350°F Combustion Efficiency (CE) = 99.9%	1

* refer to item 2 for number designation

5. The Best Available Control Technology (BACT) is applicable only to the FBB, and is triggered by the incinerator regulations (OAR 340-25-860), not the NSR (or PSD) requirements as there would be no net increase in the plant site emissions of each criteria pollutant greater than its SER, as will be unraveled in later (II & III) sections.

EPA's RACT/BACT/LAER Clearinghouse, various state environmental agencies, National Council of the Paper Industry for Air and Stream Improvement (NCASI), and other Pulp/paper mills are some of the resources James River used to gather control technology data necessary to determine the best suitable technologies for their FBB emissions. The FBB BACT analysis indicates each of the proposed control rates is better than or equivalent to the incinerator regulation, and for the most part represents the top control in its category. In summary, the following BACT limits are determined to be appropriate:

<u>Pollutant</u>	<u>Control Technology</u>	<u>BACT Emission Rate</u>	<u>Averaging Time</u>
PM	Pulse-Jet Baghouse	0.010 gr/dscf @ 7% O ₂	1 / 24 hr
SO ₂	Add CaCO ₃ / Baghouse	50 ppm @ 7% O ₂	3 / 24 hr
CO	Staged Combustion (SC)	50 ppm @ 7% O ₂	8 / 24 hr

NO _x	SNCR (NH ₃ injection)	175 ppm @ 7% O ₂	24 hr
HCl	Add CaCO ₃ / Baghouse	50 ppm @ 7% O ₂	1 hr

The BACT approval in this review is straight forward when the proposed control for a specific pollutant is clearly dominant over the other established BACTs. In the event the proposed BACT does not stand above the other BACT controls currently being employed, similarities in operating parameters are evaluated to establish a (sub)category within which the BACT analysis is conducted. The categorical review (or grouping of similar units) include, but not limited to, the fuel constituents, ratio of the fuel mixture, and/or the site location and its attainment status. The rationale for (sub)grouping is, for example, the levels of particulate control achievable by natural gas burning boilers should not be compared to the levels achievable by sludge burning boilers.

Within the sub-group, the top-down ranking of the best available control technologies is applied. Not all applicable standards are listed in this report as their comparatively lax standards became immediately apparent during the initial screening process. Each of the BACT limits selected in this permit represents the most effective option currently available. That is with a consideration given to the fact that the control(s) selected for a particular pollutant is also applicable to the other pollutant(s), and one need not be necessarily compromised at the expense of controlling the other.

PM: BACT for boilers burning only the wood wastes range from 0.007 to 0.02 gr/dscf, which represent the overall control efficiencies of 98 to 99.7%. BACT for municipal sludge combustors range from 0.01 to 0.02 gr/dscf, or 99 to 99.9% efficiencies. BACT for facilities burning fuel mixtures similar to those proposed for the FBB combustion ranged from 0.01 to 0.10 gr/dscf.

<u>Facility</u>	<u>Technology</u>	<u>Control Limit</u>
1. Simpson Tacoma	ESP, multicyclone	0.01 gr/dscf
2. Inland Empire	Baghouse	0.02 gr/dscf
3. Smurfit, Newberg	ESP	0.04 gr/dscf
4. Longview Fibre	Multicyclone, scrubber	0.10 gr/dscf
5. Port Townsend	Multicyclone, scrubber	0.10 gr/dscf

"Simpson Tacoma Kraft" located in a nonattainment area for PM₁₀ has the LAER limit of 0.01 gr/dscf. James River proposes a pulse-jet fabric filter (baghouse) control which is designed to provide a 99.9% control efficiency and the stack concentration of 0.01 gr/dscf. The 99.9% overall control efficiency, or the stack concentration limit of 0.01 gr/dscf, represents a top particulate control in its category and is acknowledged as BACT.

SO₂: The SO₂ emissions greatly depend on the fuel sulfur content, and consequently the fuel sulfur content is the primary factor influencing the BACT categorical determination. There are few boilers with which the applicable BACT standard is limiting the amount of sulfur contained in the fuel. The primary intent behind limiting sulfur in fuel is to reduce the pollutants from the front end. In cases where the high sulfur fuels must be utilized, as is the case with the FBB, traditional back-end controls are explored.

The primary/secondary sludge would be the highest sulfur containing fuel burned in the FBB. In addition, one of the solid fuels JR proposes to burn is Tire-derived fuel (TDF), a high energy fuel which helps maintain the high temperature in the boiler fluidized section. Rubber (butadiene polymer) is a soft material in its natural state, but the vulcanization (a cross linking polymerization reaction in which sulfur atoms network the butadiene chains) yields hardened rubber products, and some apparently end up as TDF after their useful service. A representative analysis further indicates TDF's average sulfur content is 1.2% on a dry basis. A significant amount of sludge and TDF will be burned in the FBB, and their combined annual capacity factor (ACF) is 0.35 (see item 8). The FBB SO₂ emission is first evaluated with respect to the boilers burning fuel mixtures consisting of the sludge and/or TDF.

<u>Facility</u>	<u>Technology</u>	<u>Control Limit</u>
1. Smurfit, Newberg	Limit S-fuel	< 0.2 lb/MM btu
2. Weyerhaeuser	None	0.6 lb/MM btu
3. Champion, ME	None	0.8 lb/MM btu
4. Lincoln, ME	Limit S-fuel	1.2 lb/MM btu
5. Longview	Limit S-fuel	2.4 lb/MM btu
James River	Dry Scrubber	0.12 lb/MM btu

The FBB's SO₂ BACT limit of 0.12 lb/MM btu is by far the most stringent emission limit when compared to existing boilers burning fuel mixtures containing sludge and TDF. The boilers examined above also use oil and/or coal, whereas James River FBB does not, and that is one of the reasons for relatively high (lax) sulfur limits.

The FBB would also use residual paper fuel which falls under a sub-category of MISW (municipal waste, see item 8). Therefore, the FBB SO₂ emission rate is evaluated against the BACT limits established for municipal waste incinerators equipped with the same type of control as JR's the FBB lime injection/baghouse system. Four of the top BACT limits applicable to the municipal waste incinerators with the dry scrubber control are listed:

<u>Facility</u>	<u>Technology</u>	<u>% Control</u>	<u>Emission Limit</u>
1. Kent County	Dry Scrubber	75%	50-75 ppm
2. Jackson County	Dry Scrubber	70%	86 ppm @12% O ₂
3. Huntington RRF	Dry scrubber	70%	90 ppm @12% O ₂
4. Ogden Martin	Dry Scrubber	70%	> 90 ppm
JR's FBB	Dry Scrubber	80%	50 ppm @7% O ₂

The dry scrubber appears to be the most stringent form of SO₂ emission control provided to the municipal waste incinerators. With lime injection, the SO₂ control efficiency is further improved. The only downside to this lime addition (control) is the formation of unwanted by-product, CaO; but easily captured by the baghouse control. James River's proposed lime injection control is accepted because it effectively brings the FBB SO₂ emission down to 50 ppm @ 7% O₂, and the toxic review determined the CaO emission would be within the acceptable range per Department's interim toxic guideline. For further information on CaO emission; refer to item 11 for the reaction (control) chemistry and see item 12 for the CaO (toxic) emission analysis.

The FBB SO₂ emission rate of 50 ppm @ 7% O₂ is the incinerator standard, and the proposed 80% removal efficiency is better than the 70% removal rate as specified in the incinerator rules. The proposed lime injection/baghouse control will provide the best all around control in terms of stack concentration, overall removal efficiency, and the loading rate. The proposed SO₂ emission control is acknowledged as BACT for James River's FBB.

CO: The 99.9% Combustion Efficiency (CE) and the stack concentration limit of 100 ppm @ 7% O₂ set forth in the Oregon incinerator regulations are in fact far more stringent than most BACT determinations currently applied to various types of boilers. Carbon Monoxide (CO) is the product of incomplete combustion, and the boiler design/operations play critical role in CO formation. James River proposes to use a typical "two staged" (primary/secondary: 1°/2°) air supply system to enhance the combustion reaction to completion.

A review of the EPA BACT Clearinghouse indicates BACT limits range from 50 to about 500 ppm (@ 7% O₂), and the BACT summary sheet indicates the most stringent emission limit established for a boiler burning only the wood wastes is at 0.15 lb/MM btu. James River FBB's 1°/2° air supply system is designed to bring down the CO emission to 50 ppm @ 7% O₂ (8 hr average), or about 0.05 lb/MM btu, plus achieve 99.9% combustion efficiency, and it is indeed BACT.

NO_x: The formation of nitrogen oxides greatly depends on the fuel nitrogen content and combustion temperature. James River proposes to use the staged combustion in conjunction with the Selective NonCatalytic Reduction (SNCR) technology to control the FBB NO_x emission. In other words, ammonia (NH₃) would be injected into the

optimum (reaction) temperature/residence time zone(s) of the FBB.
 Refer to item 11 for more detail process description and reaction chemistry; $\text{NO}_x + \text{NH}_3 \longrightarrow \text{N}_2 + \text{H}_2\text{O}$.

The SNCR technology is used by variety of industries to suppress the NO_x emission from fuel combustion. Regardless of type of control provided, the fuel nitrogen content is another major factor influencing the NO_x emission. Naturally, the NO_x emissions due to burning low nitrogen content fuels such as wood wastes would be less than the NO_x emissions due to burning high nitrogen content fuels such as pulp mill sludges, especially the nitrogen-rich (secondary) biological sludge. The FBB NO_x emission is therefore reviewed against the boilers burning the pulp/paper mill sludges:

Source	Control(s)	Control Limits	
		lb/MM btu	ppm @ 7%O ₂
1. Simpson Tacoma	none	0.25	—
2. Pope & Talbot	none	0.3	—
3. Smurfit	none	—	213
4. Inland Empire	none	—	280
5. PH Glatfelter	FBB SNCR	—	285
6. Lincoln	staged combustion	0.6	—
7. Champion, ME	none	0.7	—
8. Longview	none	0.73	433
James River	FBB SNCR	0.3	175

PH Glatfelter utilizing FBB SNCR control (same boiler & control as JR) has a NO_x limit of 285 ppm @ 7% O₂. Of the listed sources, Simpson Tacoma's 0.25 lb/MM btu limit is most restrictive. A further review indicates, in regard to NO_x emission, Simpson's wastewater treatment plant (WWTP) is significantly different from James River's. More specifically Simpson does not utilize the ASB secondary (2°) treatment like James River does, and most (> 90%) of their 2° sludge is recycled (RAS; return activated sludge) and very small amount is wasted (WAS; waste activated sludge) and burned in the boiler. As mentioned earlier, biologically treated secondary sludge (WAS) is the main source of nitrogen. The differences noted between Simpson's Riley and the James River FBB are:

	Steam lbs/hr	Sludge tons/yr	% WAS	WAS fuel tons/yr
Simpson, Riley	180,000	14,000	< 10%	1,400
James River, FBB	95,000	30,000	~34% *	10,200

* recent mill data taken from Jan/93 to July/93, a fax dated 8/26/93.

Based on above facts, excluding the NO_x limit imposed on Simpson, the proposed FBB NO_x limit of 175 ppm @7% O₂ (0.3 lb/MM btu) is top among boilers burning pulp/paper mill sludges. As discussed, the staged combustion system is already determined to be the BACT for controlling the CO emissions. This (1¹/₂°) combustion system would be operated to minimize CO emissions, and at the same time maintain the FBB temperatures below 2,050°F to minimize the high temperature oxidation of nitrogen (to NO_x) in air. The proposed NO_x limit of 175 ppm @7% O₂ (0.30 lb/MM btu) represents top in its category, and thus acknowledged as BACT for this facility.

HCl: The potential for HCl emissions exist whenever the fuel contains chlorine compounds. No HCl limit is specified for boilers burning wood-wastes only. There is one (recycled) pulp mill (P.H. Glatfelter in WI) with the mass HCl emission limit of 28 lbs/hr, which is more stringent than the HCl limit (12.3 lbs/hr) proposed for JR. Because one of the solid fuels JR proposes to burn in FBB is RPF, which falls under a sub-category of MTSW (see item 8 for EPA definition), the FBB's HCl emission is evaluated with respect to the most stringent limits established for municipal waste incinerators. Six of the eleven municipal incinerators evaluated have no HCl limit, and the top three control limits are listed below:

<u>Source</u>	<u>Control</u>	<u>Control Limit(s)</u>	
		<u>Conc.</u>	<u>% eff.</u>
James River	Dry Scrubber	50 ppmv	90%
1. Kent County	Dry Scrubber	50 ppmv	90%
2. Ogden Martin	Dry Scrubber	—	90%
3. Jackson County	Dry Scrubber	< 100 ppmv	—

Dry scrubber referenced above is actually the (wet) lime slurry scrubber. The baghouse is mainly for particulate control, but there would be some HCl adsorbed onto particulate matters and would be captured by baghouse. The FBB lime injection/baghouse system for SO₂ emission would also control the HCl emission. The FBB incinerator HCl limit of 50 ppm @ 7% O₂, 1 hr average; 90 % reduction, translates to about 12.3 lbs/hr maximum, and it is equivalent to the most stringent limit established among all categories, and therefore is the BACT.

Other control limits, for those pollutants not subject to BACT analysis, proposed in this permit include:

<u>Pollutant</u>	<u>Control</u>	<u>Permit Limit(s)</u>	<u>Ave. Time</u>
VOC	Incineration	1800°F, 1 second 50 ppm @ 7% O ₂	24 hr
Opacity	Pulse-Jet Baghouse	10%	Continuous

VOC: As will be discussed in the process/control section (item 11) of this review report, the FBB combustion gas temperature would be maintained at 1,800°F for at least 1 second. In such harsh environment, virtually all VOCs would be thermally destructed. The thermal control is the most efficient method of VOC destruction. The best available control for VOC destruction is the combustion at 1,800°F with a minimum residence time of 1 second. For the purpose of establishing the FBB VOC emission limit, using the projected stack VOC concentration of 50 ppm and the flow rate of 43,500 dscfm yields 129.8 lbs/day.

Opacity: The visible emission standard of 10% opacity is the most stringent limit applied to pulp mill boilers regardless of its fuel type. Most of the other boilers have the opacity limit of 20%.

The opacity is partially related to particulate emission (more so with PM_{10}), and a review of James River's particulate emission rate (0.010 gr/dscf @7% O_2) indicates JR would have no problem meeting the 10% opacity limit set forth in the permit.

6. The new Screw Press Boiler (SPB) with a design heat input of 5.7 MM btu/hr burns natural gas only, and it will be exclusively used to provide heat to enhance the sludge dewatering presses. The SPB emission rate is directly proportional to its natural gas consumption rate.
7. As explained in item 4, the particulate (PM) and visibility standards applicable to non-combustion sources; material handling equipments such as silos, are limited to 0.1 gr PM/dscf and 20% opacity. Incidentally these limits are identical to the SPB emission limits, as specified in the rules.

EMISSION RATES

8. As discussed in items 4 and 5, the FBB PSEs are established with respect to the most stringent regulatory/BACT standards. The table below summarizes the proposed FBB PSEs which represent the worst case situation reflecting FBB operating continuously at full capacity:

Pollutant	Emission Limit	lb/day	tons/year	lb/MM Btu
PM	0.010 gr/dscf	89.5	16.33	0.020
SO ₂	50 ppm	519.7	94.85	0.119
NO _x	175 ppm	1,306	238.40	0.299
CO	50 ppm	227.2	41.47	0.052
VOC	50 ppm	129.8	23.69	0.030
HCl	50 ppm	295.8	53.98	0.068

The above emission limits will be incorporate into the overall PSEs in section III. The permit also contains numerous operating (FBB) standards and individual emission limits to ensure the FBB emissions are minimized to the extent of the established BACT and other applicable standards. As long as the stack emissions stay within the permit emission limits, input variations such as the fuel (mixture) ratio, which may fluctuate and influence the FBB emissions, is allowed. A following table describes the projected Fluid Bed Boiler fuel (usage) ratio:

Fuel	Annual Quantity	Heating Value	Annual Capacity Factor
Wood	42,000 BDTPY	8,000 Btu/lb	0.48
Sludge	25,000 BDTPY	7,000 Btu/lb	0.25
Natural Gas	3,800,000 therm/yr	100,000 Btu/therm	0.27
TDF	4,500 BDTPY	15,500 Btu/lb	0.10
MISW(RPF)	26,400 BDTPY	7,187 Btu/lb	0.27

"Municipal-Type Solid Waste (MISW)" means refuse, more than 50 percent of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and non combustible materials such as glass and rock" (see 40 CFR 60.41b). The "Residual Paper Fuels" defined in this permit are considered a sub-category of MISW.

"Annual Capacity Factor (ACF)" means the ratio between the actual heat input to a steam generating unit from the fuels during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours during a calendar year at the maximum steady state design heat input capacity (see 40 CFR 60.41b). For example:

$$ACF (\text{wood}) = \frac{(42,000 \text{ TPY}) (2,000 \text{ lb/T}) (8,000 \text{ Btu/lb})}{(160 \text{ MM Btu/hr}) (8,760 \text{ hr/yr})} = 0.48$$

And its normalized value is $(0.48/1.37)$ 35 percent.

The maximum heat input to the FBB varies from 130.5 MM btu/hr (100% natural gas firing) to 164.1 MM btu/hr. James River estimates the average heat input would be about 160 MM Btu/hr, and the FBB would operate continuously (8,760 hrs) throughout the year. Other assumptions used to establish the FBB PSEs include a maximum stack gas flow rate of 43,500 dscfm.

9. In summary, the emissions associated with the FBB/Cogen project are dictated by the most stringent regulatory standards. Attachments at the end of this review includes detail calculations, emission factors, and assumptions used to arrive at the figures below:

Pollutant	Emissions			Total (ton/yr)
	FBB	SPB	SILOs **	
PM	16.33	0.06	1.08	17.47
SO ₂	94.85	0.06	n/a	94.91
CO	41.47	2.99	n/a	44.46
NO _x	238.40	2.49	n/a	240.89
VOC	23.69	0.12	n/a	23.81
Hcl	53.98	n/a	n/a	53.98

Pollutant	Emissions			Total (lbs/day)
	FBB	SPB	SILOs **	
PM	89.49	0.31	13.9	103.7
SO ₂	519.73	0.48	n/a	520.2
CO	227.21	16.36	n/a	243.6
NO _x	1306.30	13.64	n/a	1319.9
VOC	129.79	0.67	n/a	130.5
HCl	295.76	n/a	n/a	295.8

The SPB emissions are calculated based on the natural gas consumption rate and using the AP42's PM, SO₂, VOC emission factors for the domestic/commercial boiler category. The other SPB emission factors used are 0.12 lb CO/MM btu and 0.10 lb NO_x/MM btu, instead of AP42 factors (20 lb CO/MM ft³ and 100 lb NO_x/MM ft³). The net effect however is not that dramatic (2.99 vs 0.46 tons of CO and 2.49 vs 2.29 tons of NO_x). Other assumption used in the boiler emission calculations include the natural gas heat value of 1,086 btu/scf.

** SILO emissions include limestone silo vent, limestone day bin vent, FBB sand silo vent, ash storage silo baghouse, and ash storage silo vent. The silo particulate PSEL is based on the 0.1 gr/dscf regulatory limit and the equivalent number of hours operated - from design equipment loading rates and the estimated material usage. Attachments A22 and A24 list input parameters, and A12/A13 contains the results (emissions).

PROCESS/CONTROL DESCRIPTION

10. A new "steam extraction" turbine will be driven by high pressure steams produced by existing Recovery Furnace/Power Boiler and the new FBB. The existing Package Boiler would be retrofit into the new turbine system, but it will remain as a (stand-by) backup unit. According to the permit application (diagram 1-3), the boilers supplying 645,000 lbs/hr of 600 psig steam will drive the turbine to produce 27.9 MW of electricity, provided a turbine is operated to extract 230,000 lbs/hr of 200 psi steam while exhausting 415,000 lbs/hr of steam at 60 psi, where both the 200 and 60 psi steams are further distributed throughout the mill processes.

The turbine system would normally be operated to "thermally match" the mill's steam (energy) need, while producing electricity amounting to about 30% of mill's power need. The mill's steam needs are fixed, and the cogen system is not designed to provide more energy to the mill at the expense of the power generation (or visa versa) by extracting steam at higher pressure (and/or more steam). From an air quality perspective, the turbine by itself is not a direct air contaminant emission source, and no applicable environmental regulations exist. In this review, a simple recognition that JR's production potential could increase with this additional energy source would suffice. However, James River already has excess energy capacity and the production increase is not forecasted.

11. The FBB would stand about 60 to 70 ft tall with approximately 20x20 ft² cross sectional area. A bottom section up to about 5 ft height is the sand/solid fuels floatation zone, where the combustion of solid fuels will initially occur. The heated (450°F) primary air is introduced from the bottom at sub-stoichiometric rate of 70 to 80%, and consequently incomplete combustion (CO, VOCs) would result. Then the secondary air (450°F) is fed to the boiler at about 10 ft height at about 46% excess ratio to complete the combustion, and meet the 99.9% combustion efficiency (CE) requirement set forth in the permit. However, this (two) staged combustion system is designed mainly to effectively control the combustion temperature and suppress the NO_x formation.

As the combustion (exothermic) reaction progresses, the temperature of FBB would progressively rise to nearly 2,000°F at about 15 ft height. Then from that point on, as hot flue gases rise upward and the heat exchange occurs, the temperature will gradually drop. The flue gases exit the boiler at around 1,600°F, and prior to entering the baghouse these hot flue gases are used to heat the inlet supply air to about 450°F. The heat exchange process provides another benefit as it drops the flue gas temperature to help meet the maximum stack exit temperature limit of 350°F, that is by the time the flue gases reach the baghouse stack.

The incinerator regulation, OAR 340-25-870 (1), requires to maintain "combustion gases" at a minimum temperature of 1,800°F for at least 1 second residence time. There are temperature probes positioned at various heights along the boiler, capable of illustrating a temperature profile along the FBB vertical. This arrangement would allow the operator to monitor the compliance status with respect to the permit 1,800°F/1 second limits. The Department interprets "combustion gases" are meant to be completely combusted "flue gases", or almost combusted. As discussed earlier, a complete combustion does not occur until secondary air is introduced to FBB at around 10 ft height. This means a vertical segment of FBB that is below the 10 ft mark, a section in which its temperatures are in 1,800°F, shall not be included the residence time compliance calculations. Only the FBB section above the point of secondary air entrance (10 ft), with temperatures greater 1,800°F, shall be regarded as the attainment region.

Also recognize the fact that the linear gas velocity fluctuates as it moves upward along the boiler, as the exothermic combustion reactions generate/expand gases, and also due to the occupied spaces by water tubes and the other auxiliary boiler hardware. In other words, the stack volumetric flow rate alone will not determine the permit compliance status. These noted facts along with the measured flow rate and temperatures shall be used to determine the compliance status with respect to the permit 1800°F/1 second standard.

For NO_x control, the FBB utilizes a combination of Selective NonCatalytic Reduction (SNCR) and staged combustion. The SNCR is a gas phase reaction between NO_x and ammonia to yield nitrogen and water: $\text{NO}_x + \text{NH}_3 \rightarrow \text{N}_2 + \text{H}_2\text{O}$. The optimum reaction temperatures range from 1600 to 2200°F. There are multiple NH₃ injection ports positioned along the boiler designed to inject NH₃ into the optimum temperature region. A side benefit realized from utilizing the SNCR system is that the NO_x formation due to the oxidation of molecular N₂ in air (79%) is suppressed, as such reaction usually occurs at temperature above 2,200°F.

For SO₂ control, limestone (calcium carbonate, CaCO₃) is added to the solid waste fuel and fed into the boiler near the bottom. CaCO₃ burns to calcium oxide (CaO), or more commonly called "burnt or quick lime", then CaO reacts with SO₂ to form calcium sulfate (CaSO₄); which are mostly captured by the baghouse control system. The baghouse fabric filter is designed to operate with a layer of fly ash (CaSO₄) containing residual unreacted lime, which further reacts with SO₂ to form CaSO₄. The lime addition also controls the FBB hydrogen chloride (HCl) emissions to meet the permit BACT standard. The FBB/baghouse lime addition no doubt suppresses SO₂ and HCl emissions to meet the permit limits, but it is also the primary reason behind the CaO formation. In essence, SO₂ and HCl emissions are controlled at the expense of CaO emission. However, the CaO emission (evaluated in the toxic review section) is determined to have negligible impact. And the proposed lime injection control is accepted by the Department. For VOCs and organic HAPs control, the FBB combustion (1,800°F) provides an ideal environment for efficient thermal destruction of these pollutants.

TOXICS REVIEW

12. Potential Hazardous Air Pollutant (HAP) emissions from the combustion of bark, wood, sludge, residual paper fuels (RPF), tire-derived fuel (TDF), and natural gas were evaluated. The estimated HAP emissions are then compared to the Significant Emission Rate (SER) - as listed in the Department's toxic pollutant SER table (December 1991 draft). The SER table is currently used by the Department as a screening tool: No further evaluation is conducted for a specific HAP emission less than the SER, whereas the SER exceedance triggers the next evaluation step in which the Dispersion modelling is used to predict the maximum (worst case scenario) ambient HAP concentration at the plant boundary.

Of all listed chemicals, hydrogen chloride (HCl) and calcium oxide (CaO) are the only two HAPs from the FBB combustion which exceed DEQ's SER. Pursuant to the Department's interim toxic policy, a site specific dispersion modelling was used to predict the worst case scenario (maximum HAP concentration) at the plant boundary. The results were compared to the acceptable ambient levels of HCl and CaO:

<u>HAP</u>	<u>Predicted Max. Conc.</u>	<u>Acceptable ambient level</u>
HCl	0.6 ug/m ³	140 ug/m ³
CaO	0.062 ug/m ³	6.67 ug/m ³

Once the FBB/control system is fully erected and ready to begin its normal operation, the actual HCl and CaO emissions from the FBB will be measured, as specified in the proposed permit. The purpose of proposed stack test is to further ensure the public safety, and so the permittee shall demonstrate (after full buildup) the acceptable ambient air quality standard would not be violated: The measured stack concentration can be compared to the Department SER (December 1991 draft).

The NESHAP standard for Beryllium emission is 10 g/day, and the mercury standard is 3,200 g/day. These limits are not targeted at pulp mill nor the sludge burners (FBB), as they are not the likely source of Be/Hg emissions. James River's Ba and Hg emissions would be insignificant. James River estimates about 1.9 g/day of Be and less than 1 g/day of Hg would be emitted from FBB, and it need not be subject to the NESHAP regulations. The source test will further verify that JR is an insignificant source of NESHAP pollutants.

The Department's modelling review dated January 13, 1994 further confirms impacts due to HAP emissions from FBB are well below the acceptable risk levels.

SOURCE TESTING REQUIREMENTS

13. All source tests scheduled in the proposed permit are based on the completion of the FBB/cogen facility. Source testing requirements contained in the proposed permit include:
 - o Demonstrate the FBB/control system will operate in compliance with the proposed permit/BACT standards.

- o Demonstrate the FBB emissions of HCl and CaO, plus the other toxic pollutants that are emitted at a level greater than the DEQ's SER, are within the acceptable ambient air quality standards at the plant boundary.
- o Other periodic testing requirements, as specified in the permit, per Kraft pulp mill regulations.

COMPLIANCE SCHEDULE

14. The permit source test requirements include a definite time deadline, and no other formal compliance schedule is needed in the permit. However, as an added insurance, the permit includes a conditional compliance schedule which would solely depend on the outcome of the source test. The extra caution is needed to ensure a prompt action(s), including shutdown, to be taken by the permittee in the event the source tests fail to show compliance with the established permit standards.

MONITORING/REPORTING REQUIREMENTS

15. The incinerator regulations (OAR 340-25-875) again trigger numerous emission monitoring requirements including CEM. The FBB monitoring requirements specified in the permit reflect the applicable emission standards as listed in items 4 and 5 of this review report.

II. NON-PROJECT RELATED MODIFICATIONS

16. Some of the previous emission factors used to establish the baseline and current PSELs are updated in this review pursuant to OAR 340-14-040. The changes incorporated in this permit are mostly paper corrections and do not represent physical changes of the plant. The changes are due to including previously unaccounted for miscellaneous emissions, and the use of long-term monitoring and source test data previously unavailable.

Most noticeable changes in both baseline and current PSELs came from the use of source test data, replacing AP42 (CO, NOx, VOC) emission factors, plus reassigned natural gas usage between the power (~89%) and package (~11%) boilers. In addition, both the baseline and current VOC PSELs include chloroform emissions, which the previous permit inadvertently omitted. Chloroform (CHCl₃) by definition (OAR 340-22-102) is not exempt VOC, and therefore chloroform emissions are included in the VOC PSEL. The VOC PSEL would be updated only if the EPA determines otherwise in their future research.

Tables below summarize the changes/corrections made to the baseline PSELs. The numbers in table do not exactly match the permit PSELs as listed or emission data listed in the detail sheets (attachments), but the minor differences are mostly due to rounding off and should be overlooked. In conclusion, the proposed emission data reflect source's overall plant site emissions more accurately than previous data and shall be adopted, until better data (or unknowns) becomes available.

Baseline Emission Rates as listed in the existing permit

Pollutant	lb/day	tons/year
PM	13,149.20	1,637.40
TRS	495.10	46.20
SO2	32,920.90	1,878.30
CO	11,079.30	1,790.00
NOx	8,539.30	869.10
VOC	3,713.40	573.80

Corrected Baseline Emission Rates

Pollutant	lb/day	tons/year
PM	13,992.74	1,637.39
TRS	458.62	46.07
SO2	37,877.82	1,878.50
CO	25,065.21	1,864.14
NOx	16,926.49	1,613.35
VOC	5,020.51	744.27

The following is a list of corrections made to the Baseline Emission Rates:

- (a) Approximately 10% (847,172 therms) of the natural gas used by power boiler (8.7 MM therms) in the baseline is assigned to the package boiler (its previously assignment was zero), and the rest (90%) is retained by the power boiler.
- (b) Previously unaccounted-for fugitive methanol emissions (0.13 lbs/TADP) from bleach plant is now included. Chloroform (CHCl₃) emissions are also included in the VOC PSEL.
- (c) The AP-42 emission factors used to calculate existing Power and Package Boilers' CO, NOx, VOC emissions in the current permit are corrected to use actual source-test factors when the Power Boiler is burning either No. 6 fuel oil or natural gas, and when the Package Boiler is burning natural gas. New emission factors used to re-establish both the baseline and current PSELs are summarized in two tables following. Note that the 1991/1992 source test data were used to re-establish the 1978 baseline PSELs. The rationale for using the 91/92 test data to estimate the 1978 baseline emissions is that the boilers never received any physical modifications. The 91/92 test

data are the only "real" emission factors available, and for this review they are regarded as more credible than the AP42 national average.

Power Boiler Emission Factors for No. 6 Oil and Natural Gas

Pollutant	Averaging Period	Oil AP-42 lb/1000 gal	Oil Actual lb/1000 gal	Gas AP-42 lb/MM cu ft	Gas Actual lb/MM cu ft
CO	daily avg	5	1.02	40	1.10
	hourly max	5	1.22	40	1.30
NOx	daily avg	42	118	60	488
	hourly max	42	142	275	679
VOC	daily avg	0.76	0.82	1.4	<0.1
	hourly max	0.76	1.00	1.4	<1.0

Package Boiler Emission Factors for Natural Gas

Pollutant	Averaging Period	AP-42 lb/MM cu ft	Actual @ 2% O ₂ lb/MM cu ft * BASELINE	Actual @ 4% O ₂ lb/MM cu ft ** PROPOSED
CO	daily avg	40	3074	773
	hourly max	40	3689	928
NOx	daily avg	60	392	394
	hourly max	275	470	473
VOC	daily avg	1.40	no test	no test
	hourly max	1.40	no test	no test

The following is a list of corrections made to the Existing Plant Site Emission Limits:

- (d) As discussed in item (c), the 91/92 test data, in place of AP42 emission factors, are used to calculate the CO, NOx, and VOC PSELS for power and package boilers. It is important to note that the baseline PSELS (*) are based on the premise that package boiler was operating with 2% excess O₂, whereas the current PSELS (**) are based on JR's commitment to operate the package boiler with 4% excess O₂ to achieve the 773 lb CO/MM ft³ control level.

There is no evidence that the package boiler was operating with 2% excess O₂ in 1978, and conversely the opposite conclusion is equally valid. Given the choice, this permit focuses on the future operation (4% excess O₂) of the package boiler to encourage the minimization of CO emissions, and the baseline operating condition (2% excess O₂) is acknowledged as submitted. Although choosing one or the other emission factors for the (stand-by) package boiler is a mere "paper correction" in nature, it has the potential to impact the final outcome of the PSEL (NSR) analysis, even though it maybe just one of the many factors influencing the PSEL analysis.

For example, if both the baseline and current CO PSEs for package boiler are calculated with the same emission factor of 773 lbs/MM ft³ @4% excess O₂, or 3074 lbs/MM ft³ @2% O₂, the net increase in CO PSEL would be 99.9 tons, not 10.1 tons as determined. In either case, a net increase in CO PSEL would have come very close to triggering the NSR (PSD), as the trigger level (SER) for CO is 100 tons.

- (e) The power boiler's oil usage is reduced from 353,000 to 138,900 barrels per year, but the natural gas usage between the power and package boilers is increased from 9.23 MM to 20 MM therms/yr. And as in baseline, the same amount of natural gas usage (847,172 therms) is assigned to package boiler.
- (f) The paper machines' natural gas usage is increased from 5.5 MM to 6.3 MM therms/yr.
- (g) Through continuous monitoring systems, the long-term monitoring data are finally available, and replaced the previous single year values, as summarized in (3) tables below:

Recovery Furnace Monitoring Results (1987 to 1992)

Parameter	Particulate	TRS	Sulfur Dioxide
Concentration	0.028 gr/dscf	5 ppm	29 ppm
Emission Rate	899 lb/day 1.07 lb/ADT	84 lb/day 0.095 lb/ADT	845 lb/day 1.12 lb/ADT

Lime Kiln Monitoring Results (1982 to 1992)

Parameter	Particulate	TRS
Concentration	0.108 gr/dscf	6 ppm
Emission Rate	460 lb/day 0.51 lb/ADT	13 lb/day 0.014 lb/ADT

Smelt Dissolving Vent Monitoring Results (1982 to 1992)

Parameter	Particulate	TRS
Concentration	0.289 gr/dscf	22 ppm
Emission Rate	330 lb/day 0.397 lb/ADT	12 lb/day 0.0137 lb/ADT

The (short-term) daily PSEs are based on the regulation standards (OAR 340-25-165) and the daily maximum production forecasted; 1018 TADP/day for recovery boiler and 1172 TADP/day for Lime Kiln.

The average production rate of 886.4 TADP/day is used to establish the annual PSEs. Each of the long-term monitoring data listed above represents the mean of a finite number of measurements. It is not ideal to use this average value alone to establish the emission factors affecting the enforceable PSEs. This permit also profess that it is not entirely free of abstract emission factors, as it does, but in such cases

the uncertainties are reasonably compensated for to prevent unnecessary compliance problems from occurring. The emphasis given in reestablishing the PSEIs in this review, as shall be in the next review, is to employ the most meaningful data/method available.

Available statistical methods to predict the probability levels (range) within which the mean value lies appear to be many. There is no guarantee that the chosen method now will remain the right one forever. In this review, "the control chart method¹" developed for and applied to various large scale manufacturing operations is employed. There is no fundamental aspect behind the control chart method borrowed and employed in this permit. However, it is the method chosen by many and this permit also accepts the method¹ as the most practical method available. The experience has shown that setting the control limits at the mean value $\pm 3s$ (s : standard deviation) are appropriate. Standard deviations (stdv.) associated with each mean value listed in 3 tables above are:

	<u>TSP</u>	<u>SO2</u>	<u>TRS</u>
Recovery Furnace	0.296	0.143	0.016
Smelt Diss. Tank	0.035	—	0.0106
Lime Kiln	0.073	—	0.0048

Emission factors (mean + 3 * stdv.) used to establish the component PSEIs are listed below. These emission factors (lbs/ADUT) are compared to the regulatory standards (OAR 340-25-165), and all are set within the regulatory limits.

	<u>TSP</u>	<u>SO2</u>	<u>TRS</u>
Recovery Furnace	1.96	2.56	0.123
Smelt Diss. Tank	0.50	—	0.047
Lime Kiln	0.73	—	0.028
Miscellaneous	—	—	0.094

TRS emission factors for the most part are based on the method¹ discussed, but some have been adjusted (at source's request, 1/28/94) to represent the current source operations more accurately. There have been some improvements made to TRS emissions sources, and (at source's request) the permit miscellaneous TRS factor is now set at (0.094) below the regulatory standard of 0.156 lb/ton (340-25-165(1)(e)).

¹R.A.Day, Quantitative Analysis, 5th ed., Prentice-Hall, 1986, p.31

- (h) As in item (b), previously unaccounted-for fugitive methanol emissions (0.13 lbs/TADP) from bleach plant are now included.
- (i) A new scrubber installed in late 1992 has a 99% rated efficiency, and both the Cl_2 and ClO_2 emission factors are adjusted down accordingly, from 9.1 and 12.8 to .091 and 0.128 lbs/hr.

- (j) Also in 1992, the mill bleach plant was modified to meet the NPDES permit conditions regulating chlorinated organic compounds. As a result, the chloroform emission factors for Aeration basin and Bleach plant were decreased to 0.0185 and .035 from 0.21 and 0.76 lbs/ton respectively. Chloroform (CHCl_3) emissions are now included in the VOC PSEL.

III. THE PLANT REVIEW

Background

17. The proposed permit is a modification of an existing permit which was issued on 5/31/92 and was originally scheduled to expire on 1/01/96. In addition to the 1990 revised Kraft mill regulations incorporated in the existing permit, this permit includes the incinerator rules, BACT standards, and numerous other emission standards applicable to the new cogeneration/FBB facility. And needless to say, non-project related changes are also incorporated into the permit. Of minor note, a full plant review is not recited in this report as it was completed in the previous permit review.
18. Following items 16 (i) and (j), physical changes made at the James River facility since the last permit issuance (5/31/92) include:
- a. A new bleach plant scrubber system installed in late 1991.
 - b. A bleach plant modified in November, 1992.
 - c. A new chlorine dioxide generating plant operational since August 1992.
 - d. This permit also reflects the name change. Effective December 27, 1992, James River II, Inc. merged into James River Paper Company, Inc., a wholly owned subsidiary of James River Corporation of Virginia.
19. Once the cogeneration facility is completed, the visible and particulate emission sources/controls at the Wauna mill would consist of but not limited to the following:

Emission Sources

- a. Recovery furnace
- b. Fluid bed boiler
- c. Smelt dissolving tank vent
- d. Lime kiln
- e. Power/package boilers
- f. Screw press boiler

Control

Electrostatic precipitator
Baghouse
mesh pad mist eliminator
AIRPOL venturi scrubber

- g. Lime slaker stack water spray
 - h. Saltcake unloading system baghouse
 - i. Clay handling system baghouse
 - j. Chemical/material handling silos filters/baghouse
 - k. Paper machines & winders (rotoclones)
 - l. M & D digester feeder (cyclone)
 - m. Screen room (cyclones)
 - n. Chip/sawdust handling/transporting water spray/enclosure equipments
 - o. Chip/sawdust piles
 - p. Converting plant baghouse
 - q. Pulp dryer cyclones
 - r. (standby) NOG incinerator
20. The annual production capacity remains at approximately 320 thousand air dried tons of pulp. The plant is operated continuously except during the maintenance/emergency shutdowns.
21. Estimated annual fuel consumption consists of the following:
- a. The No.6 fuel oil and natural gas consumption rates as summarized in the attachment - A23.
 - b. Solid fuel consumption rates as listed in item 8, second Table, and in A23.

PSEL Evaluation

22. The PSELs are broken down to individual sources, and the combined rate is subtracted from the baseline PSELs. The net positive change in each of the criteria pollutant PSELs is compared to the SER. For a complete analysis, see emission detail sheets (attachments) at the end of this report. The minor deviation that may be noticeable (when compared to emission detail sheet) is accumulated effects of rounding off.

ANNUAL PSEL (tons/yr)

<u>SOURCE</u>	<u>TSP</u>	<u>TRS</u>	<u>SO₂</u>	<u>CO</u>	<u>NO_x</u>	<u>VOC</u>
Recovery Boiler	313	19.6	410	1,760	325	132
Smelt Dissolving Tank	80	7.5	32	—	—	—
Lime Kiln	117	4.5	32	16	160	40
Power Boiler	52	—	643	4	794	2.5
Fluid Bed Boiler	16	—	95	41	238	24
Other Sources	<u>837</u>	<u>15</u>	<u>19</u>	<u>53</u>	<u>96</u>	<u>273</u>

	<u>TSP</u>	<u>TRS</u>	<u>SO₂</u>	<u>CO</u>	<u>NO_x</u>	<u>VOC</u>
ANNUAL PSEL	1,415	46.6	1,231	1,874	1,613	471
BASELINE PSEL	1,637	46.1	1,879	1,864	1,613	744
UNASSIGNED PSEL	222	—	648	—	—	273
NET INCREASE	—	0.5	—	10	—	—
SER	25	10	40	100	40	40

DAILY PSEL (lbs/day)

<u>SOURCE</u>	<u>TSP</u>	<u>TRS</u>	<u>SO₂</u>	<u>CO</u>	<u>NO_x</u>	<u>VOC</u>
Recovery Boilers	4,072	175.6	9,914	11,198	2,252	841
Smelt Dissolving Tank	509	48.7	204	—	—	—
Lime Kilns	1,173	48.5	235	117	1,173	293
Power Boilers	1,633	—	21,888	97	11,312	80
Fluid Bed Boiler	89	—	520	227	1,306	130
Other Sources	<u>7,073</u>	<u>182.9</u>	<u>5,660</u>	<u>3,885</u>	<u>2,536</u>	<u>1,860</u>
DAILY PSEL	14,549	456	38,421	15,524	18,579	3,204
BASELINE PSEL	13,993	459	37,878	25,065	16,926	5,021

NOTE: The permit monitoring and reporting section requires James River to monitor and report the key parameters necessary to demonstrate compliance with the PSEs listed above. Unless otherwise specified by the Department, the guidelines below should be employed to determine compliance with the PSEs:

a. Recovery Furnace (R.F.)

- i. TSP - The actual annual equivalent recovery furnace production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TSP emission.

The daily equivalent recovery furnace production is multiplied by the most recent source test results to determine the daily TSP emissions.

- ii. TRS - The actual annual equivalent recovery furnace production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TRS emission.

The daily equivalent recovery furnace production is multiplied by the most recent source test results to determine the daily TRS emissions.

- iii. SO_2 - The actual annual equivalent recovery furnace production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual SO_2 emission.

The daily equivalent recovery furnace production is multiplied by the most recent source test results to determine the daily SO_2 emissions.

- iv. CO , NO_x , & VOC - The actual annual equivalent recovery furnace production is multiplied by the permit emission factors (see emission detail sheets) to determine the annual emissions.

The actual daily equivalent recovery furnace production is multiplied by the permit emission factors (see emission detail sheets) to determine the daily emissions.

b. Smelt Dissolving Tank

- i. TSP - The actual annual equivalent recovery furnace production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TSP emission.

The daily equivalent recovery furnace production is multiplied by the most recent source test results to determine the daily TSP emissions.

- ii. TRS - The actual annual equivalent recovery furnace production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TRS emission.

The daily equivalent recovery furnace production is multiplied by the most recent source test results to determine the daily TRS emissions.

- iii. SO_2 - The actual annual equivalent recovery furnace production is multiplied by the permit emission factor (see emission detail sheets) to determine the annual emissions.

The actual daily equivalent recovery boiler production is multiplied by the permit emission factor to determine the daily emissions.

c. Lime Kilns

- i. TSP - The actual annual equivalent kraft mill production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TSP emission.

The daily equivalent kraft mill production is multiplied by the most recent source test results to determine the daily TSP emissions.

- ii. TRS - The actual annual equivalent kraft mill production is multiplied by the annual emission factor averaged from the source tests of the last calendar year to obtain an annual TRS emission.

The daily equivalent kraft mill production is multiplied by the most recent source test results to determine the daily TRS emissions.

- iii. SO₂, CO, NO_x, & VOC - The actual annual equivalent kraft mill production is multiplied by the permit emission factors (see emission detail sheets) to determine the annual emissions.

The actual daily equivalent kraft mill production is multiplied by the permit emission factors (see emission detail sheets) to determine the daily emissions.

d. Power Boiler

The annual fuel usage in conjunction with the permit emission factors shall be used to demonstrate compliance with the annual PSEIs. The daily PSEIs are based on the maximum boiler fuel capacity for both oil and natural gas. In general, the daily oil usage of less than 79,664 gallons is an indication that the power boiler emissions are in compliance with the daily PSEIs. Refer to emission detail sheets.

e. Fluid Bed Boiler

- i. TSP, SO₂, CO, NO_x - The FBB comes with the CEM equipments and the compliance determination should be straight forward. As long as the FBB is operated in compliance with the "maximum emission limits" established in permit condition 9, the FBB emissions are in compliance (based on the design maximum stack flow of 43,500 dscfm). For the purpose of determining the FBB emissions, use the stack flow and emission factors established in the permit.
- ii. VOC - As long as the average of three or more source tests conducted within 24-hour period do not exceed 50 ppm, the FBB emissions are in compliance. The FBB combustion temperature (see permit condition 10.a.) is a compliance indicator. For the purpose of determining the FBB emissions, use the stack flow and emission factors established in the permit.

f. Other Sources

- i. TRS - The annual survey of miscellaneous TRS emission sources (excluding the recovery boiler, lime kiln, and SDT vent) is the determination of compliance with both daily and annual fugitive TRS emissions.
- ii. TSP, SO₂, NO_x, CO, VOC - All remaining pollutant sources are assumed to be emitting above criteria pollutants at the same level as listed in the emission detail sheet, until permit-specific emission estimates are replaced with verifiable source tests. When new or better emission information becomes available, the DEQ may choose to modify the affected emission data.

23. The combined Plant Site Emission Limits, excluding unassigned PSELS, are tabulated:

Pollutant	lb/day	tons/year
PM	14,549	1,415
TRS	456	46.6
SO ₂	38,421	1,231
CO	15,524	1,874
NO _x	18,579	1,613
VOC	3,204	471

PUBLIC NOTICE

24. The TRS and CO Plant Site Emission Limit (PSEL) proposed in this permit is greater than the baseline PSEL, and the proposed permit was placed on public notice from November 8, 1993 to December 8, 1993. The Department received one public comment but no public hearing was requested.

<u>Pollutant</u>	<u>Baseline</u>	<u>PSEL</u>	<u>Increase</u>	<u>SER</u>
TRS	46.1	46.6	0.5	10
CO	1864	1874	10	100

PLANT SITE EMISSION DETAIL SHEET
SUMMARY

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ANNUAL EMISSION RATES (ALL SOURCES ADDED TOGETHER)
POUNDS PER YEAR

	PM	TRS	SO2	CO	NOx	VOC	Chlorine	Chlorine Dioxide	HCl
1978 BASELINE	1637.39	46.07	1878.50	1864.14	1613.35	744.27	116.54	158.06	0.00
PSEL	1415.08	46.60	1230.83	1874.31	1613.34	470.82	0.60	0.55	53.98
OVER (UNDER) BASELINE	-222.31	0.53	-647.67	10.17	-0.01	-273.45	-115.94	-157.51	53.98
SIGNIFICANT EMISSION RATE (SER)	25.00	10.00	40.00	100.00	40.00	40.00			
AIR EMISSION FEE (\$)	\$41,405	\$1,364	\$36,014	\$0	\$47,206	\$13,776	\$17	\$16	\$1,579
TOTAL ESTIMATE (\$)	\$143,878								

DAILY EMISSION RATES (ALL SOURCES ADDED TOGETHER)
POUNDS PER DAY

	PM	TRS	SO2	CO	NOx	VOC	Chlorine	Chlorine Dioxide	HCl
1978 BASELINE	13992.74	458.62	37877.82	25065.21	16926.49	5020.51	665.94	903.22	0.00
PSEL	14548.59	455.73	38421.27	15524.44	18578.57	3203.94	3.30	3.07	295.76
OVER (UNDER) BASELINE	555.85	-2.88	543.45	-9540.77	1652.07	-1816.57	-662.64	-900.15	295.76

VOC include Acetone, Methanol, and Chloroform

DEQ HAP EMISSION RATES
POUNDS PER 8 HR.

	ACETONE	CHLORIN	ClO2	CHLOROF	HCl	METHANOL
ANNUAL EMISSION	52.8	1.1	1.0	20.91	98.6	378
SER (DRAFT)	1630	1.4	0.51	0.17	9.0	240

NOTE: Enter input data ONLY at A22 - A31 of this Spreadsheet Program.

PLANT SITE EMISSION DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg prod rate TADP/day	gas flow rate dscfm	emission factors			lb/MM ft3	fuel oil Bbls/yr	therms gas /year	particulate emissions ton/yr
				lb/TADP	gr/dscf	lb/day				
Recovery Furnace	350	886.4		3.36						521.20
Lime Kiln	350	886.4		0.76						117.89
Smelt Dissolving Vent	350	886.4		0.39						60.50
Lime Slaker Stack	350		750		0.1					2.70
Pulp Dryer	350					800				140.00
Paper Machines - pulp	350		74000		0.05					133.20
Paper Machines - gas							2.5		2900000	0.33
Converting - pulp	350		377		0.02					0.27
Converting - gas							2.5		157000	0.02
Groundwood	350		22200		0.072					57.54
Kraft Mill Cyclone	350		7400		0.007					1.86
Lime Bin cyclone	15.5		8400		0.2					2.68
Screen Room Cyclones	350		28996		0.077					80.38
Chip Handling Cyclones	350		140000		0.077					388.08
Saltcake Baghouse	17		4000		0.1					0.70
NCG Incinerator							2.5		89900	0.01
Clay Handling Baghouse	16.7		600		0.1					0.10
Power Boiler - oil							17	361111		128.92
Power Boiler - gas							2.5		7852828	0.90
Package Boiler - gas							2.5		847172	0.10
										1637.39

PLANT SITE EMISSION DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	particulate emissions lb/day
	TADP/day	dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	918.0		4.0						3672.00
Lime Kiln	1172.6		1.0						1172.60
Smelt Dissolving Vent	918.0		0.5						459.00
Lime Slaker Stack		750		0.132					20.37
Pulp Dryer		144000		0.05					1481.14
Paper Machines - pulp		74000		0.06613					1006.69
Paper Machines - gas						2.5		8286	1.91
Converting - pulp		377		0.1					7.76
Converting - gas						2.5		449	0.10
Groundwood		22200		0.1					456.69
Kraft Mill Cyclone		7400		0.1					152.23
Lime Bin cyclone		8400		0.2					345.60
Screen Room Cyclones		28996		0.1					596.49
Chip Handling Cyclones		140000		0.1					2880.00
Saltcake Baghouse		4000		0.1					82.29
NCG Incinerator						2.5		11099	2.55
Clay Handling Baghouse		600		0.1					12.34
Package Boiler - gas						2.5		42935	9.88
									12359.63 SUBTOTAL
Power Boiler - oil					20.5		79664		1633.11
Power Boiler - gas						2.5		145958	33.60
									1633.11 <- largest
									13992.74 TOTAL

PLANT SITE EMISSION DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg	gas	emission factors				fuel oil Bbls/yr	therms gas /year	TRS emissions ton/yr
		prod rate TADP/day	flow rate dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	350	886.4		0.127						19.78
Lime Kiln	350	886.4		0.042						6.59
Other Sources	350	886.4		0.127						19.70
										46.07

Source	max. prod rate TADP/day	gas	emission factors				fuel oil gal/day	therms gas /day	TRS emissions lb/day
		flow rate acfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	918.0		0.191						175.56
Lime Kiln	1172.6		0.041						48.53
Other Sources	1172.6		0.200						234.52
									458.62

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PLANT SITE EMISSIONS DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg prod rate	gas flow rate	emission factors			lb/MM BTU	lb/MM ft3	fuel oil Bbls/yr	therms gas /year	CO emissions ton/yr
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/1000 gal					
Recovery Furnace	350	886.4		11							1706.32
Lime Kiln	350	886.4		0.1							15.51
Pulp Dryer - gas								35		5680000	9.15
Pulp Dryer - propane								35		8593	0.01
Paper Machines								35		2900000	4.67
Converting								20		157000	0.14
NCG Incinerator								70		89900	0.29
Power Boiler - oil						1			381111		7.73
Power Boiler - gas								1		7852828	0.40
Package Boiler - gas								3074.0		847172	119.90
											1864.14
Source	TADP/day	max. prod rate	gas flow rate	emission factors			lb/MM BTU	lb/MM ft3	fuel oil gal/day	therms gas /day	CO emissions lb/day
			dscfm	lb/TADP	gr/dscf	lb/1000 gal					
Recovery Furnace	918.0			11							10098.00
Lime Kiln	1172.6			0.1							117.26
Pulp Dryer - gas								35		21470	69.19
Pulp Dryer - propane								35		33	0.10
Paper Machines								35		8286	26.70
Converting								20		449	0.83
NCG Incinerator								70		11099	71.54
Package Boiler - gas								3689.0		42935	14584.39
											24968.02 SUBTOTAL
Power Boiler - oil						1.220			79664		97.19
Power Boiler - gas								1		145958	17.47
											97.19 <- largest
											25065.21 TOTAL

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PLANT SITE EMISSIONS DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg	gas	emission factors				fuel oil Bbls/yr	therms gas /year	VOC
		prod rate TADP/day	flow rate dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			emissions ton/yr
Recovery Furnace	350	886.4		1.954						303.10
Recovery Furnace - gas							1.40		1130000	0.07
Lime Kiln	350	886.4		0.25						38.78
Pulp Dryer - gas							2.80		5680000	0.73
Pulp Dryer - propane							2.80		8593	0.00
Paper Machines							2.80		2900000	0.37
Converting							5.30		157000	0.04
Groundwood	350	284.1		1.1						54.69
NCG Incinerator							2.80		89900	0.01
Power Boiler - oil							0.82	361111		6.22
Power Boiler - gas							0.10		7852828	0.04
Package Boiler - gas							1.40		847172	0.05
Solvent Usage										13.41
										417.53
Source	days/yr	max.	gas	emission factors				fuel oil gal/day	therms gas /day	VOC
		prod rate TADP/day	flow rate dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			emissions lb/day
Recovery Furnace		918.0		1.954						1793.77
Recovery Furnace - gas							1.4		4270	0.55
Lime Kiln		1172.6		0.25						293.15
Pulp Dryer - gas							2.8		21470	5.54
Pulp Dryer - propane							2.8		33	0.01
Paper Machines							2.8		8286	2.14
Converting							5.3		449	0.22
Groundwood	350	300.0		1.1						330.00
NCG Incinerator							2.8		11099	2.86
Package Boiler - gas							1.40		42935	5.53
Solvent Usage	365									73.48
										2507.25 SUBTOTAL
Power Boiler - oil							1	79664		79.66 <- largest
Power Boiler - gas							1		145958	13.44
										2586.91 TOTAL

PLANT SITE EMISSIONS DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil	therms gas /year	Acetone emissions ton/yr
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives						0				0.00
Kraft Mill	350	886.4		0.1						15.51
Paper Machine Chemicals						15000				7.50
										23.01 TOTAL

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil	therms gas /day	Acetone emissions lb/day
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives	350					0				0.00
Kraft Mill		1172.8		0.1						117.28
Paper Machine Chemicals	350					15000				42.86
										160.12 TOTAL

Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil	therms gas /year	Chlorine emissions ton/yr
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives						400				0.20
Bleach Plant	350				27.7					116.34
										116.54 TOTAL

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil	therms gas /day	Chlorine emissions lb/day
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives	350					400				1.14
Bleach Plant					27.7					664.80
										665.94 TOTAL

PLANT SITE EMISSIONS DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	avg prod rate days/yr	TADP/day	gas flow rate dscfm	emission factors				fuel oil Bbls/yr	therms gas /year	ClO2 emissions ton/yr
			lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3			
Bleach Plant	350			37.634						158.06
										158.06 TOTAL

Source	max. prod rate days/yr	TADP/day	gas flow rate dscfm	emission factors				fuel oil gal/day	therms gas /day	ClO2 emissions lb/day
			lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3			
Bleach Plant				37.634						903.22
										903.22 TOTAL

Source	avg prod rate days/yr	TADP/day	gas flow rate dscfm	emission factors				fuel oil Bbls/yr	therms gas /year	Chloroform emissions ton/yr
			lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3			
Aeration Basin	350	886.4		0.2079						32.25
Bleach Plant	350	886.4		0.76						117.89
										150.14 TOTAL

Source	max. prod rate days/yr	TADP/day	gas flow rate dscfm	emission factors				fuel oil gal/day	therms gas /day	Chloroform emissions lb/day
			lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3			
Aeration Basin		1172.6		0.2079						243.78
Bleach Plant		1172.6		0.76						891.18
										1134.96 TOTAL

PLANT SITE EMISSIONS DETAIL SHEET
BASELINE EMISSIONS (CALENDAR YEAR 1978)

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Source	days/yr	avg	gas	emission factors				fuel oil	therms gas	Methanol emissions
		prod rate TADP/day	flow rate dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal			
Aeration Basin										
kraft pulping	350	886.4		0.018						2.82
liquor recovery	350	886.4		0.087						13.50
softwoods bleaching	350	886.4		0.077						12.00
hardwoods bleaching	350	886.4		0.006						0.93
groundwood pulping	350	284.1		0.005						0.25
Kraft Mill	350	886.4		0.670						103.93
Bleach Plant Fugitive	350	886.4		0.130						20.17
										153.59 TOTAL

Source	days/yr	max.	gas	emission factors				fuel oil	therms gas	Methanol emissions
		prod rate TADP/day	flow rate dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal			
Aeration Basin										
kraft pulping		1172.6		0.018						21.34
liquor recovery		918.0		0.087						79.87
softwoods bleaching		1172.6		0.077						90.70
hardwoods bleaching		1172.6		0.006						7.04
groundwood pulping		300.0		0.005						1.50
Kraft Mill		1172.6		0.670						785.64
Bleach Plant Fugitive		1172.6		0.130						152.44
										1138.52 TOTAL

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg	gas	emission factors				fuel oil Bbls/yr	therms gas /year	particulate emissions ton/yr
		prod rate TADP/day	flow rate dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	361	886.4		1.96						313.27
Lime Kiln	361	886.4		0.73						116.64
Smelt Dissolving Vent	361	886.4		0.50						80.00
Lime Slaker Stack	361		750		0.1					2.78
Pulp Dryer	361					800				144.40
Paper Machines - pulp	365		74000		0.05					138.91
Paper Machines - gas							2.5		6300000	0.73
Converting - pulp	365		377		0.02					0.28
Converting - gas							2.5		164000	0.02
Groundwood	365		22200		0.072					60.01
Kraft Mill Cyclone	361		7400		0.007					1.92
Lime Bin cyclone	15.5		8400		0.2					2.68
Screen Room Cyclones	361		28996		0.077					82.90
Chip Handling Cyclones	361		140000		0.077					400.28
Saltcake Baghouse	17		4000		0.1					0.70
NCG Incinerator							2.5		92777.7	0.01
Clay Handling Baghouse	16.7		600		0.1					0.10
Power Boiler - oil							17	138900		49.59
Power Boiler - gas							2.5		20000000	2.30
Package Boiler - gas							2.5		847172	0.10
Fluid Bed Boiler	365		43500		0.01					16.33
Screw Press Boiler - gas							2.5		497677.5	0.06
Limestone Silo Vent	30.42		550		0.1					0.01
Limestone Day Bin Vent	91.25		500		0.1					0.12
Ash Storage Silo Baghouse	182.50		1000		0.1					0.94
h Storage Silo Vent	182.50		2.78		0.1					0.01
h Sand Silo Vent	30.42		550		0.1					0.0002
										1415.08
									BASELINE	1637.39
									CREDIT	222.31

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	particulate emissions lb/day
	TADP/day	dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	1018.0		4.0						4072.00
Lime Kiln	1172.8		1.0						1172.80
Smelt Dissolving Vent	1018.0		0.5						509.00
Lime Slaker Stack		750		0.132					20.37
Pulp Dryer		144000		0.05					1481.14
Paper Machines - pulp		74000		0.066					1006.69
Paper Machines - gas						2.5		17260	3.97
Converting - pulp		377		0.1					7.78
Converting - gas						2.5		449	0.10
Groundwood		22200		0.1					456.69
Kraft Mill Cyclone		7400		0.1					152.23
Lime Bin cyclone		8400		0.2					345.60
Screen Room Cyclones		28996		0.1					596.49
Chip Handling Cyclones		140000		0.1					2880.00
Saltcake Baghouse		4000		0.1					82.29
NCG Incinerator						2.5		11454	2.84
Clay Handling Baghouse		600		0.1					12.34
Package Boiler - gas						2.5		42935	9.88
Fluid Bed Boiler		43500		0.01					89.49
Screw Press Boiler - gas						2.5		1363.5	0.31
Limestone Silo Vent		550		0.1					0.97
Limestone Day Bin Vent		500		0.1					2.57
Ash Storage Silo Baghouse		1000		0.1					10.29
Ash Storage Silo Vent		2.78		0.1					0.06
FBB Sand Silo Vent		550		0.1					0.01
									=====
									12915.48 SUBTOTAL
Boiler - oil					20.5		79664		1633.11 <- largest
Boiler - gas						2.5		145958	33.60
									=====
									14548.59 TOTAL
									13992.74 BASELINE
									-555.85 CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	TRS emissions ton/yr
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/day	lb/1000 gal			
Recovery Furnace	361	886.4		0.123						19.60
Lime Kiln	361	886.4		0.028						4.50
Smelt Dissolving Vent	361	886.4		0.047						7.50
Other Sources	361	886.4		0.094						15.00
										46.60
									BASELINE	46.07
									* NO CREDI	-0.53

Source	TADP/day	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	TRS emissions lb/day
		acfm	lb/TADP	lb/ton BLS	lb/day	lb/MM ft3	lb/MM ft3			
Recovery Furnace	1018.0		0.172							175.56
Lime Kiln	1172.6		0.041							48.53
Smelt Dissolving Vent	1018.0			0.033						48.71
Other Sources	1172.6		0.156							182.93
										455.73
									BASELINE	458.62
									* NO CREDI	2.88

* NO CREDIT ALLOWED FOR MANDATORY REDUCTION DUE TO RULE CHANGE

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	SO2 emissions ton/yr
		TADP/day	dscfm	lb/TADP	ppm	lb/day	lb/1000 gal			
Recovery Furnace	361	886.4		2.56						409.59
Lime Kiln	361	886.4		0.2						32.00
Smelt Dissolving Vent	361	886.4		0.2						32.00
Pulp Dryer - gas							2.6		5680000	0.68
Pulp Dryer - propane							2.6		8593	0.00
Paper Machines							2.6		6300000	0.75
Converting							2.6		164000	0.02
NCG Incinerator - NCG	8.1	886.4		4.8						17.23
NCG Incinerator - gas							2.6		92777.7	0.01
Power Boiler - oil							219.8	138900		641.13
Power Boiler - gas							2.6		20000000	2.40
Package Boiler - gas							2.6		847172	0.10
Fluid Bed Boiler	365		43500		50					94.85
Screw Press Boiler - gas							2.6		497677.5	0.06
										1230.83
									BASELINE	1878.50
									CREDIT	647.67

Source	TADP/day	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	SO2 emissions lb/day
			dscfm	lb/TADP	ppm	lb/day	lb/1000 gal			
Recovery Furnace	1018.0			9.7						9914.24
Lime Kiln	1172.6			0.2						234.52
Smelt Dissolving Vent	1018.0			0.2						203.60
Pulp Dryer - gas							3.8		21470	7.46
Pulp Dryer - propane							3.8		33	0.01
Paper Machines - gas							3.8		17260	6.00
Converting - gas							3.8		449	0.16
NCG Incinerator - NCG	1172.6			4.8						5628.48
NCG Incinerator - gas							3.8		11454	3.98
Package Boiler - gas							3.8		42935	14.93
Fluid Bed Boiler			43500		50					519.73
Screw Press Boiler - gas							3.8		1363.5	0.48
										16533.59 SUBTOTAL
Power Boiler - oil							274.8	79664		21887.68
Power Boiler - gas							3.8		145958	50.74
										21887.68 <- largest
										38421.27 TOTAL
										37877.82 BASELINE
										-543.45 CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg	gas	emission factors				fuel	therms	CO
		prod rate	flow rate	lb/TADP	ppm	lb/1000 gal	lb/MM BTU		oil gas	
		TADP/day	dscfm				lb/MM ft3	Bbls/yr	/year	emissions ton/yr
Recovery Furnace	361	886.4		11						1759.95
Lime Kiln	361	886.4		0.1						16.00
Pulp Dryer - gas							35		5680000	9.15
Pulp Dryer - propane							35		8593	0.01
Paper Machines							35		6300000	10.15
Converting							20		164000	0.15
NCG Incinerator							70		92777.7	0.30
Power Boiler - oil						1.02		138900		2.98
Power Boiler - gas							1.10		20000000	1.01
Package Boiler - gas							773		847172	30.15
Fluid Bed Boiler	365		43500		50					41.47
Screw Press Boiler - gas							0.12		497677.5	2.99
										1874.31
									BASELINE	1864.14
									CREDIT	-10.17
Source	TADP/day	max. prod rate	gas flow rate	emission factors				fuel	therms	CO
			dscfm	lb/TADP	ppm	lb/1000 gal	lb/MM BTU		oil gas	
							lb/MM ft3	gal/day	/day	emissions lb/day
Recovery Furnace	1018.0			11						11198.00
Lime Kiln	1172.6			0.1						117.26
Pulp Dryer - gas							35		21470	69.19
Pulp Dryer - propane							35		33	0.10
Paper Machines							35		17260	55.63
Converting							20		449	0.83
NCG Incinerator							70		11454	73.83
Package Boiler - gas							928		42935	3668.83
Fluid Bed Boiler			43500		50					227.21
Screw Press Boiler - gas							0.12		1363.5	16.36
										15427.25
										SUBTOTAL
Power Boiler - oil						1		79664		97.19
Power Boiler - gas							1		145958	17.47
										97.19
										<-- largest
										15524.44
										TOTAL
										25065.21
										BASELINE
										9540.77
										CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	NOx emissions ton/yr
		TADP/day	dscfm	lb/TADP	ppm	lb/day	lb/1000 gal			
Recovery Furnace	361	886.4		2.0						319.99
Recovery Furnace - gas								92	1166000	4.92
Lime Kiln	361	886.4		1						160.00
Pulp Dryer - gas								140	5680000	36.61
Pulp Dryer - propane								140	8593	0.06
Paper Machines								140	6300000	40.61
Converting								100	164000	0.76
NCG Incinerator								140	92777.7	0.60
Power Boiler - oil							118	138900		344.19
Power Boiler - gas								488	20000000	449.36
Package Boiler - gas								394	847172	15.37
Fluid Bed Boiler	365		43500		175					238.40
Screw Press Boiler - gas						0.10	← lb/MM btu		497677.5	2.49
										1613.34
									BASELINE	1613.35
									CREDIT	0.01

Source	TADP/day	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	NOx emissions lb/day
		TADP/day	dscfm	lb/TADP	ppm	lb/day	lb/1000 gal			
Recovery Furnace - liquor	1018.0			2						2036.00
Recovery Furnace - gas								550	4270	216.25
Kiln	1172.6			1						1172.60
Dryer - gas								140	21470	276.78
Dryer - propane								140	33	0.42
Paper Machines								140	17260	222.51
Converting								100	449	4.14
NCG Incinerator								140	11454	147.66
Package Boiler - gas								473	42935	1870.00
Fluid Bed Boiler			43500		175					1306.30
Screw Press Boiler - gas						0.10	← lb/MM btu		1363.5	13.64
										7266.28
										SUBTOTAL
Power Boiler - oil							142	79664		11312.29
Power Boiler - gas								679	145958	9125.76
										11312.29
										← largest
										18578.57
										TOTAL
										16926.49
										BASELINE
										-1652.07
										CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate TADP/day	gas flow rate dscfm	emission factors				fuel oil Bbls/yr	therms gas /year	VOC emissions ton/yr
				lb/TADP	ppm	lb/day	lb/1000 gal	lb/MM ft3		
Recovery Furnace	361	886.4		0.826						132.16
Recovery Furnace - gas								1.4	1166000	0.08
Lime Kiln	361	886.4		0.25						40.00
Pulp Dryer - gas								2.8	5680000	0.73
Pulp Dryer - propane								2.8	8593	0.00
Paper Machines								2.8	6300000	0.81
Converting								5.3	164000	0.04
Groundwood	365	342.5		1.1						68.75
NCG Incinerator								2.8	92777.7	0.01
Power Boiler - oil							0.82		138900	2.39
Power Boiler - gas								0.1	20000000	0.09
Package Boiler - gas								1.4	847172	0.05
Solvent Usage										13.41
Fluid Bed Boiler	365		43500		50					23.69
Screw Press Boiler - gas								5.3	497677.5	0.12
										282.33
									BASELINE	417.53
									CREDIT	135.19
Source	days/yr	max. prod rate TADP/day	gas flow rate dscfm	emission factors				fuel oil gal/day	therms gas /day	VOC emissions lb/day
				lb/TADP	ppm	lb/day	lb/1000 gal	lb/MM ft3		
Recovery Furnace		1018.0		0.826						840.87
Recovery Furnace - gas								1.4	4270	0.55
Lime Kiln		1172.6		0.25						293.15
Pulp Dryer - gas								2.8	21470	5.54
Pulp Dryer - propane								2.8	33	0.01
Paper Machines								2.8	17260	4.45
Converting								5.3	449	0.22
Groundwood	365	375.0		1.1						412.50
NCG Incinerator								2.8	11454	2.95
Package Boiler - gas								1.4	42935	5.53
Fluid Bed Boiler			43500		50					129.79
Screw Press Boiler - gas								5.3	1363.5	0.67
Solvent Usage	365									73.48
										1769.70
										1769.70 SUBTOTAL
Power Boiler - oil							1		79664	79.66 <- largest
Power Boiler - gas								1	145958	13.44
										1849.37
									BASELINE	2586.91
									CREDIT	737.54

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	Acetone emissions ton/yr
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives						0				0.00
Kraft Mill	361	886.4		0.1						16.00
Paper Machine Chemicals						15000				7.50
										23.50 TOTAL
										23.01 BASELINE
										-0.49 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	Acetone emissions lb/day
		TADP/day	dscfm	lb/TADP	gr/dscf	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives	361					0				0.00
Kraft Mill		1172.6		0.1						117.26
Paper Machine Chemicals	365					15000				41.10
										158.36 TOTAL
										160.12 BASELINE
										1.76 CREDIT

Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	Chlorine emissions ton/yr
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives						400				0.20
Bleach Plant	361			0.09141						0.40
										0.60 TOTAL
										116.54 BASELINE
										115.94 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	Chlorine emissions lb/day
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fugitives	361					400				1.11
Bleach Plant				0.09141						2.19
										3.30 TOTAL
										665.94 BASELINE
										662.64 CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	ClO2 emissions ton/yr
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Bleach Plant	361			0.1279556						0.55
										0.55 TOTAL
										158.06 BASELINE
										157.51 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	ClO2 emissions lb/day
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Bleach Plant				0.1279556						3.07
										3.07 TOTAL
										903.22 BASELINE
										900.15 CREDIT

Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	Chloroform emissions ton/yr
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Aeration Basin	361	886.4		0.0185						2.96
Bleach Plant	361	886.4		0.035						5.60
										8.56 TOTAL
										150.14 BASELINE
										141.58 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	Chloroform emissions lb/day
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Aeration Basin		1172.6		0.0185						21.60
Bleach Plant		1172.6		0.035						41.04
										62.73 TOTAL
										1134.96 BASELINE
										1072.23 CREDIT

PLANT SITE EMISSIONS DETAIL SHEET
PROPOSED PLANT SITE EMISSION LIMITS (PSEL)

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Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	HCl emissions ton/yr
		TADP/day	dscfm	ppm	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fluid Bed Boiler	365		43500	50						53.98
										53.98 TOTAL
										0.00 BASELINE
										-53.98 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	HCl emissions lb/day
		TADP/day	dscfm	ppm	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Fluid Bed Boiler			43500	50						295.76
										295.76 TOTAL
										0.00 BASELINE
										-295.76 CREDIT

Source	days/yr	avg prod rate	gas flow rate	emission factors				fuel oil Bbls/yr	therms gas /year	Methanol emissions ton/yr
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Aeration Basin										
kraft pulping	361	886.4		0.016974						2.72
liquor recovery	361	886.4		0.08114						12.98
softwoods bleaching	361	886.4		0.07214						11.54
hardwoods bleaching	361	886.4		0.005596						0.90
groundwood pulping	365	342.5		0.004663						0.29
Mill	361	886.4		0.67						107.20
Bleach Plant Fugitive	361	886.4		0.13						20.80
										156.42 TOTAL
										153.59 BASELINE
										-2.83 CREDIT

Source	days/yr	max. prod rate	gas flow rate	emission factors				fuel oil gal/day	therms gas /day	Methanol emissions lb/day
		TADP/day	dscfm	lb/TADP	lb/hr	lb/yr	lb/1000 gal	lb/MM ft3		
Aeration Basin										
kraft pulping		1172.6		0.016974						19.90
liquor recovery		1018.0		0.08114						82.00
softwoods bleaching		1172.6		0.07214						84.59
hardwoods bleaching		1172.6		0.005596						6.56
groundwood pulping		375.0		0.004663						1.75
Kraft Mill		1172.6		0.67						785.64
Bleach Plant Fugitive		1172.6		0.13						152.44
										1133.49 TOTAL
										1138.52 BASELINE
										5.04 CREDIT

BASELINE

PSEL

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ANNUAL AVERAGE PRODUCTION

Recovery Furnace, TADP/day	886.4	886.4
Lime Kiln, TADP/day	886.4	886.4
Smelt Dissolving Vent, TADP/day	886.4	886.4
Kraft Mill, TADP/day	886.4	886.4
ICG Incinerator, TADP/day	886.4	886.4
Paper Machines, TADP/day	886.4	886.4
Groundwood Mill, TADP/year	99440	125000

DAILY MAXIMUM PRODUCTION

Recovery Furnace, TADP/day	918.0	1018.0
Lime Kiln, TADP/day	1172.6	1172.6
Smelt Dissolving Vent, TADP/day	918.0	1018.0
Kraft Mill, TADP/day	1172.6	1172.6
ICG Incinerator, TADP/day	1172.6	1172.6
Paper Machines, TADP/day	1172.6	1172.6
Groundwood, TADP/day	300.0	375.0

NO. OF OPERATING DAYS PER YEAR

Recovery Furnace	350	361
Lime Kiln	350	361
Smelt Dissolving Vent	350	361
Lime Slaker Stack	350	361
Pulp Dryer	350	361
Paper Machines - pulp	350	365
Paper Machines - gas	350	365
Converting - pulp	350	365
Converting - gas	350	365
Groundwood	350	365
Kraft Mill Cyclone	350	361
Lime Bin Cyclone	15.5	15.5
Screen Room Cyclones	350	361
Chip Handling Cyclones	350	361
Saltcake Baghouse	17	17
ICG Incinerator	8.1	8.1
Clay Handling Baghouse	16.7	16.7
Power Boiler - oil	365	365
Power Boiler - gas	365	365
Package Boiler - gas	365	365
Misc. TRS Sources	350	361
Solvent Usage	365	365
Fluid Bed Boiler	0	365
Screw Press Boiler	0	365
Limestone Silo Bin Vent Filter	0	30.42
Limestone Day Bin Vent Filter	0	91.25
Ash Storage Silo Baghouse	0	182.50
Ash Storage Silo Bin Vent Filter	0	182.50
FBB Sand Silo Bin Vent Filter	0	30.42

STACK GAS FLOW RATE, DSCFM

BASELINE

PSEL

Recovery Furnace	152100	152100
Lime Slaker Stack	750	750
Pulp Dryer	144000	144000
Paper Machines - pulp	74000	74000
Paper Machines - gas	74000	74000
Converting - pulp	377	377
Groundwood	22200	22200
Kraft Mill Cyclone	7400	7400
Lime Bin cyclone	8400	8400
Screen Room Cyclones	28996	28996
Chip Handling Cyclones	140000	140000
Saltcake Baghouse	4000	4000
Clay Handling Baghouse	600	600
Power Boiler - oil	94900	94900
Power Boiler - gas	84500	84500
Package Boiler	47500	47500
Fluid Bed Boiler	n/a	43500
Screw Press Boiler		
Limestone Silo Bin Vent Filter	n/a	550
Limestone Day Bin Vent Filter	n/a	500
Ash Storage Silo Baghouse	n/a	1000
Ash Storage Silo Bin Vent Filter	n/a	2.778
FBB Fluidizing Sand Silo Bin Vent Fil	n/a	550

* PSEL based on ng. usage

FUEL OIL USAGE	BASLINE	PSEL
Power Boiler		
Bbls/year	381111	138900
max. gal/day	79664	79664
boiler efficiency, %	87.51	87.51
net heat input req'd, BTU/lb steam	1110	1110
steam generated, lb/hr	210726	81055
Lime Kiln		
Bbls/year	51810	51810
max. gal/day	8225	8225

NATURAL GAS USAGE	BASLINE	PSEL
Recovery Furnace		
therms/year	1130000	1166000
max. therms/day	4270	4270
Lime Kiln		
therms/year	1080000	6500000
max. therms/day	4006	23800
Pulp Dryer		
therms/year	5680000	5680000
max. therms/day	21470	21470
Paper Machines		
therms/year	2900000	6300000
avg. therms/day	8286	17260
Converting		
therms/year	157000	164000
avg. therms/day	449	449
NCG Incinerator		
therms/year	89900	92778
avg. therms/day	11099	11454
Power Boiler		
therms/year	7852828	20000000
max. therms/day	145958	145958
boiler efficiency, %	83.58	83.58
net heat input req'd, BTU/lb steam	1110	1110
steam generated, lb/hr	67500	171912
steam generated (oil + gas), lb/hr	278226	252967
Package Boiler (existing)		
therms/year	847172	n/a
max. therms/day	42935	n/a
boiler efficiency, %	71.68	n/a
net heat input req'd, BTU/lb steam	1110	n/a
steam generated, lb/hr	6245	n/a
Package Boiler (new source)		
therms/year	n/a	847172
max. therms/day	n/a	42935
boiler efficiency, %	n/a	71.68
net heat input req'd, BTU/lb steam	n/a	1110
steam generated, lb/hr	n/a	6245
Fluid Bed Boiler		
therms/year	0	3800000 * estimation - does not influence
max. therms/day	0	34000 * FBB emission calculations
Screw Press Boiler		
therms/year	0	497677.5
max. therms/day	0	1363.5

PROPANE USAGE	BASLINE	PSEL
Pulp Dryer		
therms/year	8593	8593
max. therms/day	32.5	32.5

FLUID BED BOILER SOLID FUELS	BASLINE	PSEL
Mill Bark, OD TPY	0	14400
Tree Farm Bark, OD TPY	0	9000
Kraft Mill Rejects, OD TPY	0	3700
Reclaim Alley Rejects, OD TPY	0	3000
Woodmill Refuse, OD TPY	0	3000
Screen Rejects, OD TPY	0	700
Screw Press Sludge, OD TPY	0	30000
Mill Trash, OD TPY	0	30
TDF, MM BTU/hr	0	13
Waste Paper, MM BTU/hr	0	41

PARTICULATE EMISSION FACTORS

BASLINE

PSEL

Recovery Furnace - saltcake		
daily ave., lb/TADP	3.36	1.96 **
0-25-165(2)(a), lb/TADP	4.00	4.00
daily max., lb/day	3672	4072
Recovery Furnace - gas		
included with saltcake	incl.	incl.
Lime Kiln - lime dust		
daily avg., lb/TADP	0.76	0.73 **
340-25-165(2)(b), lb/TADP	1.00	1.00
daily max., lb/day	1173	1173
Lime Kiln - oil or gas		
included with lime dust	incl.	incl.
Smelt Dissolving Vent		
daily avg., lb/TADP	0.39	0.50 ***
340-25-165(2)(c), lb/TADP	0.50	0.50
daily max., lb/day	459	509
Lime Slaker Stack		
daily avg., gr/dscf	0.1	0.1
hourly max., gr/dscf	0.132	0.132
Pulp Dryer - pulp		
daily avg., lb/day	800	800
hourly max., gr/dscf	0.05	0.05
Pulp Dryer - propane or gas		
included with pulp	incl.	incl.
Paper Machines - pulp		
daily avg., gr/dscf	0.05	0.05
hourly max., gr/dscf	0.06613	0.06613
Paper Machines - gas		
daily avg., lb/MM cu ft	2.5	2.5
hourly max., lb/MM cu ft	2.5	2.5
Converting - pulp		
daily avg., gr/dscf	0.02	0.02
hourly max., gr/dscf	0.1	0.1
Converting gas		
daily avg., lb/MM cu ft	2.5	2.5
hourly max., lb/MM cu ft	2.5	2.5
Groundwood		
daily avg., gr/dscf	0.072	0.072
hourly max., gr/dscf	0.1	0.1
Kraft Mill Cyclone		
daily avg., gr/dscf	0.007	0.007
hourly max., gr/dscf	0.1	0.1
Lime Bin Cyclone		
daily avg., gr/dscf	0.2	0.2
hourly max., gr/dscf	0.2	0.2
Screen Room Cyclones		
daily avg., gr/dscf	0.077	0.077
hourly max., gr/dscf	0.10	0.10
Chip Handling Cyclones		
daily avg., gr/dscf	0.077	0.077
hourly max., gr/dscf	0.10	0.10
Saltcake Baghouse		
daily avg., gr/dscf	0.10	0.10
hourly max., gr/dscf	0.10	0.10

PARTICULATE EMISSION FACTORS (continue)

BASLINE

PSEL

Incinerator - gas		
daily avg., lb/MM cu ft	2.5	2.5
hourly max., lb/MM cu ft	2.5	2.5
Clay Handling Baghouse		
daily avg., gr/dscf	0.10	0.10
hourly max., gr/dscf	0.10	0.10
Power Boiler - oil		
daily avg., lb/1000 gal (avg S)	17.0	17.0
hourly max., lb/1000 gal (max S)	20.5	20.5
Power Boiler - gas		
daily avg., lb/MM cu ft	2.5	2.5
hourly max., lb/MM cu ft	2.5	2.5
Package Boiler - gas		
daily avg., lb/MM cu ft	2.5	2.5
hourly max., lb/MM cu ft	2.5	2.5
Fluid Bed Boiler		
daily avg., gr/dscf	n/a	0.010
hourly max., gr/dscf	n/a	0.010
Screw Press Boiler - gas		
daily avg., lb/MM cu ft	n/a	2.5
hourly max., lb/MM cu ft	n/a	2.5
Limestone Silo Vent		
daily avg., gr/dscf	n/a	0.1
hourly max., gr/dscf	n/a	0.1
Limestone Day Bin Vent		
daily avg., gr/dscf	n/a	0.1
hourly max., gr/dscf	n/a	0.1
Ash Storage Silo Baghouse		
daily avg., gr/dscf	n/a	0.1
hourly max., gr/dscf	n/a	0.1
Ash Storage Silo Vent		
daily avg., gr/dscf	n/a	0.1
hourly max., gr/dscf	n/a	0.1
FBB Sand Silo Vent		
daily avg., gr/dscf	n/a	0.1
hourly max., gr/dscf	n/a	0.1

** average + 3 standard deviation.

*** Rule limit (ave. + 3stdv. = 0.502)

TRS EMISSION FACTORS

BASELINE

PSEL

Recovery Furnace

daily avg., lb H₂S/TADP

0.13

0.123 : ave. + 3 stdv. = .095 + 3*.016 = 0.143

25-165(1)(a), ppm as H₂S

10

10

daily max., lb H₂S/TADP

0.19

0.17 <- calculated from permit limit, measured gas flow and max. prod. rate

Lime Kiln

daily avg., lb H₂S/TADP

0.04

0.028 : ave. + 3 stdv. = .014 + 3*.0048 = 0.0284

340-25-165(1)(b), ppm as H₂S

20

20

daily max., lb H₂S/TADP

0.04

0.04

Smelt Dissolving Vent

daily avg., lb H₂S/TADP

n/a

0.047 : ave. + 3 stdv. = .0137 + 3*.0106 = .0455

340-25-165(1)(c), lb H₂S/TON BLS

n/a

0.033

daily max., lb H₂S/TADP

n/a

0.048

lb BLS/TADP

n/a

2900

Misc. TRS Sources

daily avg., lb H₂S/TADP

0.13

0.094 : adjusted down per source's request (1/28/94)

daily max., lb H₂S/TADP

0.20

0.156

SO₂ EMISSION FACTORS

BASELINE

PSEL

Recovery Furnace - black liquor

daily avg., lb/TADP

0.84

2.56 <-- ave. + 3 stdv.

340-25-165(3), ppm

300

300

daily max., lb/TADP

10.80

9.74 <-- calculated from permit limit, measured gas flow and max. prod. rate

Recovery Furnace - gas

included with black liquor

incl.

incl.

Lime Kiln - lime mud

daily avg., lb/TADP

0.20

0.20

daily max., lb/TADP

0.20

0.20

Lime Kiln - oil or gas

included with lime mud

incl.

incl.

Smelt Dissolving Vent

daily avg., lb/TADP

0.20

0.20

daily max., lb/TADP

0.20

0.20

Pulp Dryer - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Pulp Dryer - propane

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Paper Machines - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Converting - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

NCG Incinerator - noncondensable gas

daily avg., lb/TADP

4.8

4.8

hourly max., lb/TADP

4.8

4.8

NCG Incinerator - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Power Boiler - oil

daily avg., lb/1000 gal (avg S)

219.8

219.8

hourly max., lb/1000 gal (max S)

274.8

274.8

Power Boiler - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Package Boiler - gas

daily avg., lb/MM cu ft

2.6

2.6

hourly max., lb/MM cu ft

3.8

3.8

Fluid Bed Boiler

daily avg., ppm

n/a

50

hourly max., ppm

n/a

50

Screw Press Boiler - gas

daily avg., lb/MM cu ft

n/a

2.6

hourly max., lb/MM cu ft

n/a

3.8

CO EMISSION FACTORS	BASLINE	PSEL
Recovery Furnace - black liquor		
daily avg., lb/TADP	11.0	11.0
hourly max., lb/TADP	11.0	11.0
Recovery Furnace - gas		
included with black liquor	incl.	incl.
Lime Kiln - lime mud		
daily avg., lb/TADP	0.10	0.10
hourly max., lb/TADP	0.10	0.10
Lime Kiln - oil or gas		
included with lime mud	incl.	incl.
Pulp Dryer - gas		
daily avg., lb/MM cu ft	35.0	35.0
hourly max., lb/MM cu ft	35.0	35.0
Pulp Dryer - propane		
daily avg., lb/MM cu ft	35.0	35.0
hourly max., lb/MM cu ft	35.0	35.0
Paper Machines - gas		
daily avg., lb/MM cu ft	35.0	35.0
hourly max., lb/MM cu ft	35.0	35.0
Converting - gas		
daily avg., lb/MM cu ft	20.0	20.0
hourly max., lb/MM cu ft	20.0	20.0
NCG Incinerator - noncondensable gas		
daily avg., lb/MM cu ft	70.0	70.0
hourly max., lb/MM cu ft	70.0	70.0
Power Boiler - oil		
daily avg., lb/1000 gal	1.02	1.02
hourly max., lb/1000 gal	1.22	1.22
Power Boiler - gas		
daily avg., lb/MM cu ft	1.10	1.10
hourly max., lb/MM cu ft	1.30	1.30
Package Boiler (existing) - gas		
daily avg., lb/MM cu ft	3074.00	n/a
lb/MM BTU		
hourly max., lb/MM cu ft	3689.00	n/a
lb/MM BTU		
Package Boiler (new source) - gas		
daily avg., lb/MM cu ft	n/a	773.00
lb/MM BTU		
hourly max., lb/MM cu ft	n/a	928.00
lb/MM BTU		
Fluid Bed Boiler		
daily avg., ppm	n/a	50
hourly max., ppm	n/a	50
Screw Press Boiler - gas		
daily avg., lb/MM cu ft	n/a	20 <-- AP42 factor
lb/MM BTU		0.12 <-- Use JR estimate
hourly max., lb/MM cu ft	n/a	20 <-- AP42 factor
lb/MM BTU		0.12 <-- Use JR estimate

NOX EMISSION FACTORS	BASELINE	PSEL	
Recovery Furnace - black liquor			
daily avg., lb/TADP	2.0	2.0	
hourly max., lb/TADP	2.0	2.0	
Recovery Furnace - gas			
design heat input, BTU/hr	7.02E+08	7.02E+08	boiler design value of 175000 lb/hr black liq @ 68% TS
daily avg., lb/MM cu ft	92	92	
hourly max., lb/MM cu ft	550	550	
Lime Kiln - lime mud			
daily avg., lb/TADP	1.0	1.0	
hourly max., lb/TADP	1.0	1.0	
Lime Kiln - oil or gas			
included with lime mud	incl.	incl.	
Pulp Dryer - gas			
daily avg., lb/MM cu ft	140	140	
hourly max., lb/MM cu ft	140	140	
Pulp Dryer - propane			
daily avg., lb/MM cu ft	140	140	
hourly max., lb/MM cu ft	140	140	
Paper Machines - gas			
daily avg., lb/MM cu ft	140	140	
hourly max., lb/MM cu ft	140	140	
Converting - gas			
daily avg., lb/MM cu ft	100	100	
hourly max., lb/MM cu ft	100	100	
NCG Incinerator - gas			
daily avg., lb/MM cu ft	140	140	
hourly max., lb/MM cu ft	140	140	
Power Boiler - oil			
daily avg., lb/1000 gal	118	118	
lb/MM BTU			
hourly max., lb/1000 gal	142	142	
lb/MM BTU			
Power Boiler - gas			
daily avg., lb/MM cu ft	488	488	
lb/MM BTU			
hourly max., lb/MM cu ft	679	679	
lb/MM BTU			
Package Boiler (existing) - gas			
daily avg., lb/MM cu ft	392	n/a	
lb/MM BTU		n/a	
hourly max., lb/MM cu ft	470	n/a	
lb/MM BTU		n/a	
Package Boiler (new source) - gas			
daily avg., lb/MM cu ft	n/a	394	
lb/MM BTU	n/a		
hourly max., lb/MM cu ft	n/a	473	
lb/MM BTU	n/a		
Fluid Bed Boiler			
daily avg., ppm	n/a	175	
hourly max., ppm	n/a	175	
Screw Press Boiler - gas			
daily avg., lb/MM cu ft	n/a	100 <— AP42 factor	
lb/MM BTU		0.10 <— Use JR estimate	
hourly max., lb/MM cu ft	n/a	100 <— AP42 factor	
lb/MM BTU		0.10 <— Use JR estimate	

VOC EMISSION FACTORS	BASELINE	PSEL
Recovery Furnace - black liquor		
daily avg., lb/TADP	1.954	0.826
hourly max., lb/TADP	1.954	0.826
Recovery Furnace - gas		
daily avg., lb/MM cu ft	1.40	1.40
hourly max., lb/MM cu ft	1.40	1.40
Lime Kiln - lime mud		
daily avg., lb/TADP	0.25	0.25
hourly max., lb/TADP	0.25	0.25
Lime Kiln - oil or gas		
included with lime mud	incl.	incl.
Pulp Dryer - gas		
daily avg., lb/MM cu ft	2.80	2.80
hourly max., lb/MM cu ft	2.80	2.80
Pulp Dryer - propane		
daily avg., lb/MM cu ft	2.80	2.80
hourly max., lb/MM cu ft	2.80	2.80
Paper Machines - gas		
daily avg., lb/MM cu ft	2.80	2.80
hourly max., lb/MM cu ft	2.80	2.80
Converting - gas		
daily avg., lb/MM cu ft	5.30	5.30
hourly max., lb/MM cu ft	5.30	5.30
Groundwood		
daily avg., lb/TADP	1.10	1.10
hourly max., lb/TADP	1.10	1.10
NCG Incinerator - gas		
daily avg., lb/MM cu ft	2.80	2.80
hourly max., lb/MM cu ft	2.80	2.80
Power Boiler - oil		
daily avg., lb/1000 gal	0.82	0.82
hourly max., lb/1000 gal	1.00	1.00
Power Boiler - gas		
daily avg., lb/MM cu ft	0.10	0.10
hourly max., lb/MM cu ft	1.00	1.00
Package Boiler - gas		
daily avg., lb/MM cu ft	1.40	1.40
hourly max., lb/MM cu ft	1.40	1.40
Solvents		
volatile fraction, %	100	100
annual usage, lb/yr	26620	26620
Fluid Bed Boiler		
daily avg., ppm	n/a	50
hourly max., ppm	n/a	50
Screw Press Boiler - gas		
daily avg., lb/MM cu ft	n/a	5.30
hourly max., lb/MM cu ft	n/a	5.30

	BASELINE	PSEL
ACETONE EMISSION FACTORS		
Fugitives, lb/yr	0	0
Kraft Mill, lb/ton	0.1	0.1
Paper Machine Chemicals, lb/yr	15000	15000
CHLORINE EMISSION FACTORS		
Fugitives, lb/yr	400	400
Bleach Plant, lb/hr	27.7	0.091
CHLORINE DIOXIDE EMISSION FACTORS		
Bleach Plant, lb/hr	37.6	0.128
CHLOROFORM EMISSION FACTORS		
Aeration Basin, lb/ton	0.21	0.0185
Bleach Plant, lb/ton	0.76	0.0350
HYDROGEN CHLORIDE EMISSIONS FACTORS		
Fluid Bed Boiler, ppm	n/a	50
METHANOL EMISSION FACTORS		
Aeration Basin, lb/ton, Total —————>	0.19	0.18
from kraft pulping	0.018	0.017
from liquor recovery	0.087	0.081
from bleaching		
softwoods	0.077	0.072
hardwoods	0.006	0.006
from groundwood pulping	0.005	0.005
Kraft Mill, lb/ton	0.67	0.67
Bleach Plant Fugitive, lb/ton	0.13	0.13

HCl factors for TDF & waste paper not used
 (considered included in 50 ppm limit)
 values are 9.95E-03 & 1.08E-02, respectively

MISCELLANEOUS FACTORS AND CONVERSIONS

avg fuel oil sulfur content, %	1.40	1.40
max fuel oil sulfur content, %	1.75	1.75
avg. nat. gas sulfur content, gr/MM CU FT	9100	9100
max. nat. gas sulfur content, gr/MM CU FT	13200	13200

gallons fuel oil per barrel	42 gal/Bbl
fuel oil specific gravity	1.00

BTU's per therm nat. gas	100000 BTU/therm	
BTU value of natural gas	1086 BTU/cu ft	1086
BTU value of No. 6 fuel oil	18500 BTU/lb	
BTU value of Black Liquor Solids	5900 BTU/lb	

grains in one pound	7000 gr/lb
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molecular weight of Sulfur	32.00 lb/lb-mole
molecular weight of SO ₂	64.07 lb/lb-mole
molecular weight of CO	28.01 lb/lb-mole
molecular weight of NO ₂	46.01 lb/lb-mole
molecular weight of NMHC (as methane)	16.00 lb/lb-mole
molecular weight of HCl	36.46 lb/lb-mole

AIR EMISSION FEES (draft), \$/ton

particulate	\$29.26
TRS	\$29.26
sulfur dioxide	\$29.26
carbon monoxide	\$0.00
oxides of nitrogen	\$29.26
VOC's	\$29.26
HAPs	\$29.26

ASE FEE	\$2,500
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	SER (lbs/8 hr)	
	Fugitive	Stack
Acetone	1630	3250
Chlorine	1.4	2.7
ClO ₂	0.26	0.51
Chloroform	0.174	1.005
HCl	4	9
Methanol	240	470